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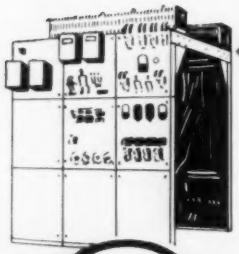

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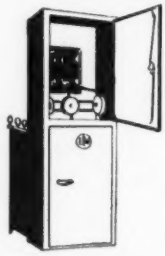

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Behind the Scenes...

Baseballitis

With Labor Day and all we're writing this a little earlier than usual and by the time it reaches you old man Shrdlu will have taken over the rein again and the Cleveland Indians may or may not be still in the race. All we know right now is that this town is absolutely batty about baseball, and if Joe Stalin suddenly appeared on the White House doorsteps asking could he please see Mr. Harry, the story would get crowded off the front page by the report of the day's game. Why, our little woman couldn't have told you six months ago whether a two bagger was an over night case or what, but now she's as glib as the president of the knot hole gang. But, both through nervous tension and lack of sleep the Cleveland rooters are undermining their health. These night games keep you up so darned late and then those ninth inning rallies leave you shaking like a leaf and you can't go to sleep for trying. Boy, we can hardly wait for football season. Then you only have to worry once a week.

For You We'll Steal

We'll probably get spanked for this, but we happened to walk into the advertising department this morning just as the stock room boy delivered the first copy off the press of a brand new booklet. No one has seen it yet around here—not even our advertising salesmen, but we were so taken with it we'll be glad to steal you a copy if you just ask us to. It is called "How STEEL Makes Your Advertising Dollars Worth More" which we'll admit sounds awfully commercial, but it is really a dandy job.

New Face

If we were a betting man, which we are, we'd be willing to wager a small beer or its equivalent that you passed right by the front cover this week and didn't notice a change that involved a lot of heavy deciding around here. And we'll be glad to stand the beers all around because you weren't supposed to notice it. You see, we get awfully fussy about our masthead, just as you probably do about your trademark or the style of lettering used in your company name. There has been a feeling for some time that the five letters in STEEL should get a little chummier and move closer together. Also, the "S" in STEEL has been having a hard time for years from falling flat on its face, so it has been straightened up and given a new lease on life. We hope you like it, now that you have turned back to look at it.

RSD Scores Again

We're more or less used to receiving all sorts of inquiries and with very few exceptions are able to crash through with what is wanted. As a result we become a little blase and even an inquiry like the one in the mail this week doesn't seem to phase anyone. It was just that some fellow wanted to know where he could get a complete aluminum rolling mill. Yes, and who's next please?

Via The Grapevine

It is being whispered around the ninth floor editorial rooms that something pretty big is underway. As we get it second hand, the boys are taking another step in helping out the poor steel consumer by compiling some extremely helpful information on steel products and prices. We'll flash you the details just as soon as they're official.

Plant Profiles

Last week, as you will recall, we ran a picture of the Durham Manufacturing Co. office building which looks for all the world like a nice six room house. Now we've got an idea but it needs your cooperation. We would like to run here a series of Behind the Scenes shots of unusual metalworking plants throughout the country. It may be that your plant is operating in a George Washington slept here building or you may be sporting a brand new ultra modern affair. You may have the biggest plant in the country or the littlest. Whatever it is, if it is unusual let's have a picture of it and we'll all have a lot of fun. Mail it to Shrdlu, c/o STEEL, Penton Building, Cleveland 13.

Shrdlu

(Editorial Index—page 63)

STEEL
Vol. 123—No. 10 September 13, 1948

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Published by THE PENTON PUBLISHING Co., Penton Building, Cleveland 13, Ohio, E. L. SHANER, President and Treasurer; G. O. HAYS, Vice President and General Manager; R. C. JAENKE, Vice President; F. G. STEINEBACH, Vice President and Secretary; E. L. WERNER, Assistant Treasurer. Member, Audit Bureau of Circulations; Associated Business Papers Inc., and National Publishers' Association.

Published every Monday. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $10; two years $15; all other countries, one year $18. Single copies (current issues) 35c. Entered as second class matter at the postoffice at Cleveland, under the Act of March 3, 1879. Copyright 1948 by the Penton Publishing Co.

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Bearing and Lubricants Center for Studying Machinery Problems

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Evaluation of Strip Plating Aided by Electrolyte Cell

Description of Automatic Simplified Oxygen System

STEEL

The Magazine of Metalworking and Metalproducing

VOL 123, NO. 11 SEPTEMBER 13, 1948

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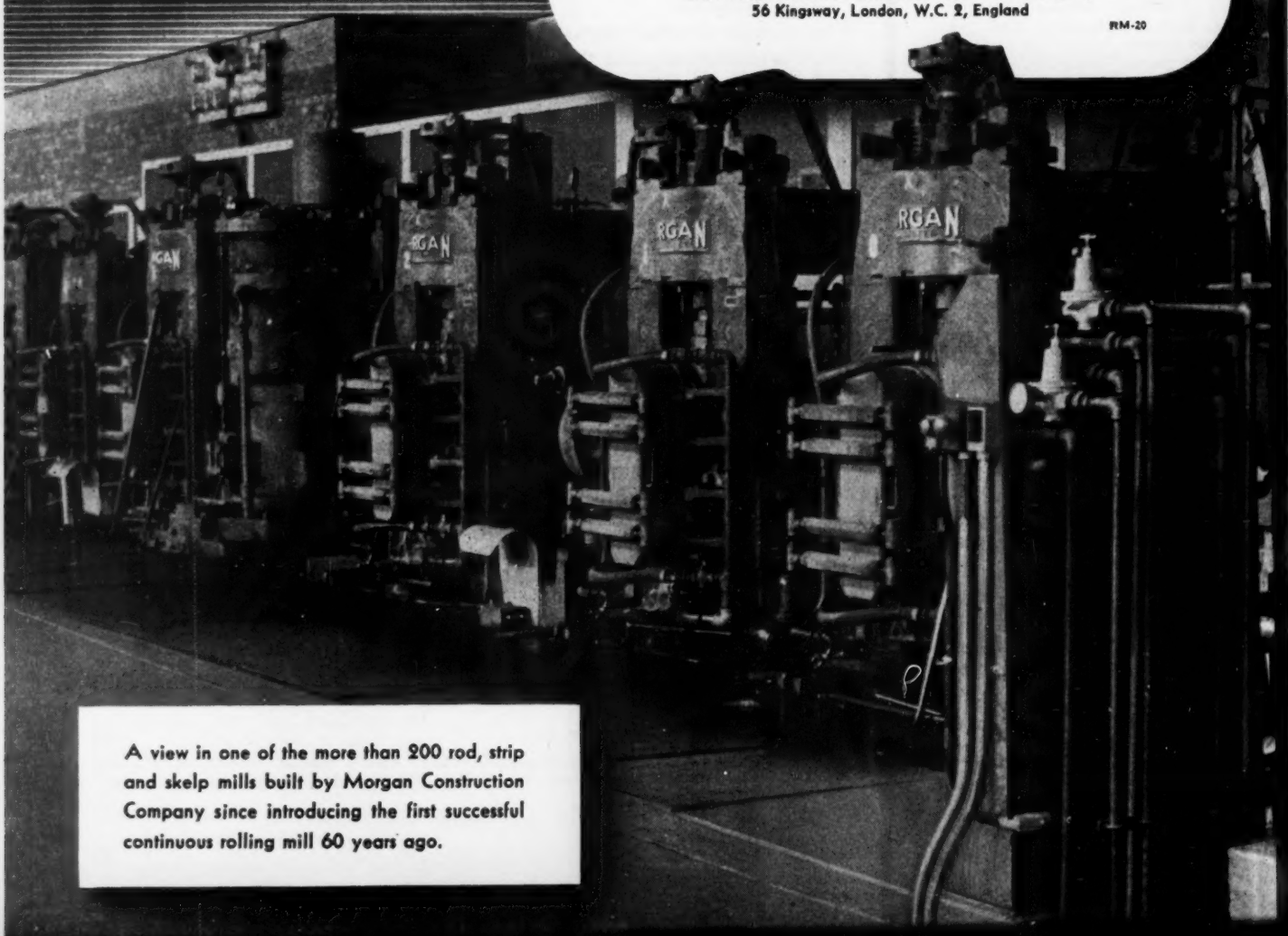


A view in one of the more than 200 rod, strip and skelp mills built by Morgan Construction Company since introducing the first successful continuous rolling mill 60 years ago.

September 13, 1948

Welcome Surprise

When American manufacturers try to plan for the future on the basis of the amount of finished steel they may be able to procure, they have to take into account a number of complicating factors.

First is the available producing capacity which—barring strikes and similar contingencies—limits the tonnage that can be produced. Second is the amount of steel that will be siphoned out of the open market by companies which purchase facilities to provide them with a private source of supply. Third is the tonnage of steel that will be pre-empted for the armed services. Fourth is the tonnage that will be required for the European Recovery Program. Fifth is the amount of steel going to favored consumers under voluntary allocations.

If a steel buyer could put down definite tonnage figures for all of these five factors, he could calculate fairly closely what his share of the resulting remainder would be. It is almost impossible to do this because the tonnage involved in three of the five factors cannot be ascertained ahead of the event. There is no way of knowing how much steel will be required for the defense program and for ERP, nor of the net tonnage that actually will be lost to the open market through the purchase of mills and furnaces for private supply. The amount of steel to be diverted by these three factors is in the lap of the gods.

However, consumers can get a fairly definite line on the other two factors. During the fourth quarter the 10 programs under voluntary allocations will take 491,500 tons of steel monthly. Prior to the advent of voluntary allocations, these 10 consuming outlets were taking 343,800 tons monthly. Thus voluntary allocations constitute a net drain from the common pool of only 147,700 tons monthly.

Meanwhile capacity has improved to the extent that shipments to date in 1948 are running about 200,000 tons per month ahead of those of the comparable period in 1947. The gain in shipments exceeds the net drain of allocated steel by 52,300 tons monthly.

That there is a gain rather than a deficit in this segment of the steel supply situation will be a welcome surprise to distressed consumers.

* * *

PHANTOM WAR ORDERS: Executives in the metalworking industries will be among the first to try out the system of "phantom" production orders developed by the National Security Resources Board. Under this plan, the government will issue hypothetical contracts for certain defense material and equipment, with details as to quantity required, exact specifications, and price to be paid. This and other information will permit the contractor to make all necessary plans for executing the contract. The phantom contracts can be made effective by telegram on M-Day.

The first orders under the plan will be issued to machine tool builders for 100,000 machine tools. If this program works out satisfactorily, procurement orders will be issued to other industries. Contracts of this type may run into billions of dollars.

The estimate by NSRB that these phantom contracts could reduce the time required to mobilize American industry for war by from five months to one year probably is conservative. One has only to recall the tremendous amount

(OVER)

of work required in World War II before production began to realize that starting from a thoroughly digested phantom contract has a great advantage over starting from scratch.

However, success of what appears to be a practical plan will call for intelligent teamwork. Perhaps it is fortunate that the first test will be with machine tools. Here the specifications are pretty well established and the government will be working with a closely knit industry which has an enviable record for performing miracles. —p. 72

* * *

NEW DRIVES FOR SCRAP: Persistent efforts to build up a more satisfactory backlog of iron and steel scrap for the approaching winter months gained renewed impetus last week. In New England a six-state drive was launched to collect 100,000 tons of scrap quickly to offset an acute shortage of foundry pig iron. In Washington on Wednesday the iron and steel scrap industry considered the possibility of improving the flow of scrap from Germany through the formation of a central purchasing corporation. On the following day hundreds of trade association executives met in Washington under Department of Commerce auspices to plan a new nation-wide scrap collection campaign.

Scarcity of scrap has been widely publicized almost continuously for years, yet supply seldom has been able to gain upon demand. The pending drives for foreign and domestic material must be powerful, all-out affairs if industry is to go through the winter with adequate scrap supplies. —p. 74

* * *

PRICE DEBATE LOOMS: Senate Trade Policies Subcommittee, of which Senator Homer E. Capehart is chairman, is questioning chambers of commerce and trade associations in an effort to obtain information as to how recent Supreme Court decisions and Federal Trade Commission rulings on pricing systems affect the business of their members. A typical question tries to establish the extent to which plant pricing would increase sales for big companies with strategically located plants and hinder small companies with only a single plant.

Meanwhile congressional action on pricing is being sought by two campaigns, one by a steel producer and the other by a group of manufacturers. Chairman Ernest T. Weir of National Steel Corp. is urging customers to ask Congress to legalize the basing point system. Associated Industries of Massachusetts seeks a revision of the Robinson-Patman Act to restrict powers of FTC.

Pricing methods will be a subject for lively discussion throughout industry and in the halls of Congress for months. —p. 75

* * *

LABOR'S VOTE ELUSIVE: Few industrialists were surprised when President Truman opened his campaign by coming out flatly for repeal of the Taft-Hartley Act. It fits in nicely with his renewed effort to woo the vote of labor union members and others who contributed to the election successes of New Deal candidates in the past.

It is doubtful whether this strategy will work. Union members are not as bitterly opposed to the T-H legislation as are some union chiefs. Oddly enough, the President and most union leaders who have criticized T-H severely never have proposed modifications of it. More congressmen of Mr. Truman's own party voted for T-H than opposed it.

Labor is not going down the line solidly for Candidate Truman. Union spokesmen told the President he could count on 300,000 at his Detroit appearance. About one-tenth of this number turned out and they were not noticeably enthusiastic. In 1948 the "labor vote" is not going to be delivered to any candidate en masse. —p. 78

* * *

WORK FOR CONVEYORS: On his 80th birthday, Thomas Robins Sr., who developed the belt conveyor in 1891 and is now chairman of Hewitt-Robins Inc., voiced interesting comments on the future use of conveyors.

Coal mining, he warned, will need to mechanize completely within the next 10 years in order to hold its present markets against competition. He cited an Illinois coal mine, recently "conveyorized," in which production has reached the impressive figure of 32 tons per man day. This is about three times the average for American coal mining and 10 times that for British practice.

Mr. Robins predicts that the next major industry to go for conveyors in a big way will be iron ore. The advent of many new beneficiating plants, he believes, will necessitate a new approach to the problem of handling ore. —p. 97

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

MORE "FREE" STEEL— Channeling of 9 per cent of total steel output into approved voluntary allocations programs has been widely interpreted as causing a serious pinch in steel supplies available to nonparticipating industries during the fourth quarter. This is not necessarily true. Requirements for the 10 approved allocation programs after Oct. 1 will amount to 491,500 tons of steel monthly. However, the programs now covered by allocations received an average of 343,800 tons monthly during the fourth quarter of 1947. Thus the allocations programs constitute an added drain from available supplies of only 147,700 tons monthly (71). Meanwhile, overall finished steel production this year has been running about 200,000 tons monthly ahead of last year, and the Office of Industry Co-operation expects fourth quarter production to be 300,000 tons monthly above that for 1947. This indicates there should be more rather than less steel available to nonparticipants.

PHANTOM ORDERS— Industrial mobilization is progressing steadily. Early next month the defense planning agencies will undertake a novel and interesting experiment designed to minimize delay in war production should an emergency arise. Phantom orders, to be filled on paper only, will go to 300 machine tool builders (p.72). Later, similar ghost orders will go to many other metalworking companies, covering a vast array of material, costing billions of dollars. Should war come, or should actual mobilization become necessary, the "if" orders would be transformed into actual orders by telegram.

SEEK PRICING CLARIFICATION— Legislation to legalize the basing point system of pricing is being asked from diverse quarters (p.75). Salesmen of National Steel are suggesting to customers that they ask Congress to take definitive action. The Associated Industries of Massachusetts is seeking revision of the Robinson-Patman Act. Senator Capehart's trade policies committee is checking industry's views and finding that most prefer basing point to mill pricing. Meanwhile, a large electrical equipment maker figures the changeover to mill pricing has added a half million dollars annually to its steel bill.

TAFT-HARTLEY— Many people have wondered why labor union leaders and administration officials in opposing the Taft-Hartley Act have consistently urged its outright repeal rather than revision to eliminate some of the objectionable provisions (p.78). Union leaders believe the chances for repeal, while admittedly slight, are better with the law in its present form than if it were modified. Perhaps more important is that fact the T-H law serves as a cohesive factor for unions generally; opposition to it is the one thing they can agree upon. Meanwhile, Republican lawmakers are considering some revisions of their own that may make the law tougher on unions.

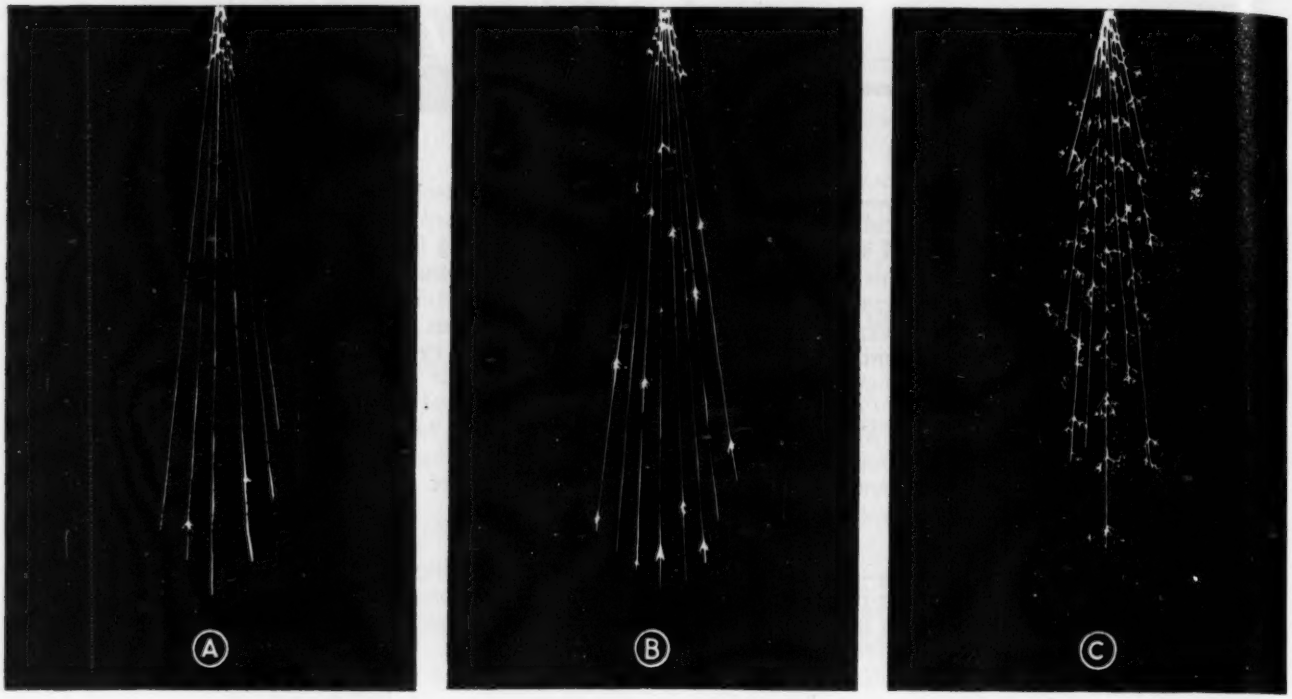
EUROPE— Shortage of steel is the main chokepoint in the expansion of Europe's industrial activities (p. 81). Back of the steel shortage is the scarcity of good quality coke.

NEW FACILITIES— Columbia Steel Co.'s new tin plate and cold sheet mill at Pittsburg, Calif., will be completed in October (p.76). United States Pipe & Foundry will build a new cast iron pipe plant at Richmond, Calif. General Electric has dedicated a new x-ray laboratory at Milwaukee.

SCRAP— Creation of a corporation to act as exclusive agent for the purchase of German scrap has been approved by scrap dealers, and establishment of such an agency is going forward (p. 74). Scrap thus imported will be allocated to foundries and steel mills by the Office of Industry Cooperation.

HERE AND THERE— American-made goods going to Europe under the recovery program will carry a stars and stripes emblem (p. 80) to publicize the extent of American aid and to help check the end uses of the material . . . Lebanon Steel Foundry has obtained exclusive license for use of the centri-die process for casting alloy steels, a technique which will aid production of components for jet engines (p. 73) . . . Permanente Metals Corp., a Kaiser interest, has leased a government-owned aluminum mill at Newark, O. (p. 88).

Engineering News, p. 99 *Market Summary, p. 163*



Mark your answers here. Carbon content of steel A. is __% B. is __% C. is __% Correct spark readings are given at lower left

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A PENTON PUBLICATION

More "Free" Steel Available

Increased production this year will more than cover additional steel channeled into approved programs. Pinch will be tightest in plates, with third of output allocated

MORE "free" steel should be available to consuming industries not benefiting from the voluntary allocations program during the fourth quarter this year than they received during the comparable 1947 period.

This is true in spite of the fact that slightly more than 9 per cent of total finished steel production will be allocated under the 10 programs already approved.

The 10 approved allocation programs will take 491,500 net tons of steel products per month during the fourth quarter. During the fourth quarter of 1947, an estimated 343,800 net tons of steel monthly was used for purposes now embraced in the 10 programs. The increase in tonnage going to the 10 programs during the fourth quarter will be 147,700 tons monthly (see table).

Production Is Higher — However, overall production of finished steel is running ahead of last year by about 200,000 tons a month. The Office of Industry Co-operation expects fourth quarter production this year to exceed fourth quarter of 1947 output by 300,000 tons monthly, barring now unforeseen strikes or other interruptions.

The increased production thus will more than offset the increase in shipments to the approved allocation programs. Should OIC estimates be accurate, only half of the increased production will be absorbed by the increased allocation shipments.

Pinch in Plates — The tightest pinch from the allocation programs will be in plates. The approved programs call for 176,479 tons of plates monthly starting Oct. 1, almost a third of the average monthly production during the first half of this year. The tanker program will take about 30,000 tons more plates per month, the atomic energy program will take 8335 tons monthly, the freight car, barge and oil field equipment programs will take more.

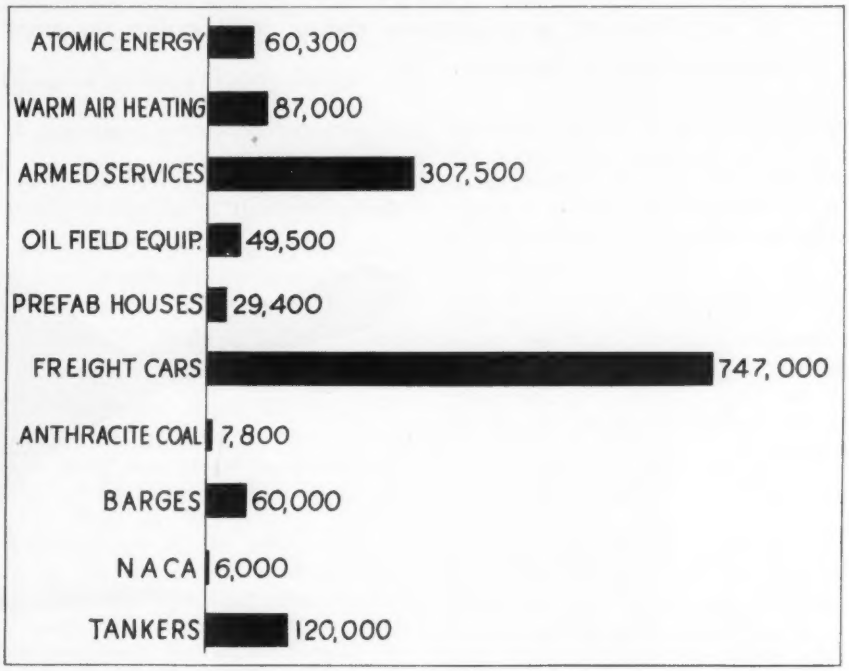
Sheet and strip requirements of the allocation programs will be 96,145 tons monthly, or about 6 per cent of total sheet and strip output. Structural shape requirements for allocated programs will be 67,077 tons monthly, slightly less than 20 per cent of output during the first half of this year.

Other Programs Studied—Although a number of other voluntary allocation programs are being considered by OIC and affected industries, it is doubtful whether any of these will be approved in time to alter the figures for fourth quarter substantially. OIC officials entertain some honest doubts as to how much further the voluntary allocations program can be extended. They question whether or not it would be wise to allocate a much higher percentage of total steel output than is called for in the 10 approved programs.

The time element also is running against new programs. Public Law 395 will expire next February. Congress probably will extend it before that time, but there may be some changes made in the law.

Virden Retires — Resignation of John C. Virden, OIC director, is viewed by Washington officials as a case of private necessity for getting back to his electrical fixtures manufacturing business in Cleveland. OIC continues a going concern under

FOURTH QUARTER STEEL ALLOCATION REQUIREMENTS
(Net Tons)



MONTHLY STEEL REQUIREMENTS OF APPROVED PROGRAMS

	4th Quarter, 1498	4th Quarter, 1947	Increase
	(Tons per month)		
U. S. Atomic Energy Commission	20,100	.....	+ 20,100
Warm Air Heating Equipment for Homes	29,000	26,000	+ 3,000
Armed Services	102,500	67,500	+ 35,000
Oil Field Tanks—Well head equipment	16,500	14,200	+ 2,300
Prefabricated Steel Houses	9,800	.....	+ 9,800
Freight Cars and Repairs	249,000	210,000	+ 39,000
Anthracite Coal Mining—Maintenance	2,600	2,600	.....
Barges for Inland Waterways	20,000	18,000	+ 2,000
National Advisory Committee for Aeronautics	2,000	500	+ 1,500
Oil Tankers—New and Repairs	40,000	5,000	+ 35,000
	491,500	343,800	147,700

Acting Director Earl W. Clark, former Illinois state director of employment and former liquidation official for OPA.

Asks Farm Equipment Program

A VOLUNTARY steel allocation program for the farm machinery and equipment industry was proposed last week by Sen. Kenneth Wherry (Rep., Nebr.), head of the Senate Small Business Committee.

Several months ago members of the industry advisory committee for the farm machinery industry decided they did not want to participate in an allocation program.

On the basis of questionnaires sent to manufacturers of farm equipment, Senator Wherry says the smaller companies are not getting enough steel. Ninety-three per cent are receiving less than they obtained in 1947, says the senator.

"If the existing advisory committee does not want to participate in a program, it is suggested that a new and more representative group of those who need assistance be selected," the senator wrote to Secretary of Commerce Charles Sawyer.

Phantom War Orders on Way

Machine tool industry to be guinea pig in program designed to eliminate preparedness delay. "If" orders to start flowing early in October

PHANTOM orders for the material needed for a possible World War III will begin to flow from Washington to machine tool builders and many other metalworking companies within the next few weeks. The phantom orders will be only paper work, but they are counted on by the National Security Resources Board and other defense planning agencies to speed up the procurement of the necessaries for waging war should an emergency arise.

If mobilization becomes necessary, the ghost orders would be transformed into actual orders by telegram or letter. NSRB hopes that the recipients of the stand-by orders then would be ready to get into production in a hurry and to avoid the loss of time which characterized our preparedness in the past two wars.

Machine Tools First—Initial ghost orders to be placed will be for machine tools. Early in October, according to present schedules, paper orders for 100,000 tools will be sent to some 300 builders. These will have a phantom value of between $700 and $800 million.

Recipients of the orders will be expected to plan on what changes would be necessary to start production on the orders at the rates specified. The phantom contractor should decide what new equipment he would need, find out where it could be obtained, what new technicians or other increased personnel would be required, whether additional financing would be needed to fill the order. Informal arrangements with potential subcontractors should be made "just in case." Planning should include everything that would be necessary to convert from peacetime production to war production.

All this will be wholly voluntary. The government is not yet prepared to offer financial aid to companies executing the phantom orders.

"Normal" Planning—The defense agencies regard the phantom order program as a sensible way of eliminating the delay of getting into war production. Its advantages are in letting potential war contractors know what they will be expected to make and how much and how fast. The planning that will be required of business, they say, is just about what business would do anyway in anticipating possible future orders.

If and when an emergency comes, the defense agencies believe 4 to 12 months could be saved in getting into production on critically needed materiel, a time factor that could spell the difference between victory and defeat.

Orders Will Be Big—After the machine tool orders will come large paper orders for communications equipment, electronic materials, motors, military trucks, steel, aluminum tubing, and a vast array of other components and materials needed for war. The plan is not yet far enough along to say definitely just what all will be ordered but the total is expected to run into billions of dollars —on paper.

If the program works out as the NSRB hopes it will, the phantom orders will be revised periodically to keep pace with new developments in weapons and equipment and in the industrial developments and techniques.

Pre-Solving Problems — Defense planners do not expect that the program will work without a hitch. Placing of actual orders after an emergency had arisen never did. A big advantage of the plan is that time will be available to work out problems disclosed by the placing of the orders.

Maybe a plant receiving a ghost order will find that it cannot fill it, at

This automatic rocket launcher, capable of firing six rounds of 38-lb rockets, was developed especially for use in high-speed jet planes. Previously, rockets were launched from the wings, but the drag cut down speed prohibitively. This launcher, mounted in the nose of the plane, minimizes the drag problem and increases accuracy and rate of fire power. The launcher was developed by the United Shoe Machinery Corp., Boston, and Air Materiel Command

least cannot execute it efficiently. The difficulties can be thrashed out in conference between the procurement agencies and the contractor and either facilities changed to enable execution of the order or the order can be placed elsewhere, and the tentative contractor's facilities freed for other work.

Plants Already Checked — The phantom order program is a natural follow-up of the survey of potential war contractors which procurement agencies have been making for some months. The allocations of the ghost orders will be on the basis of what the defense planners have learned about specific industrial facilities in the company-to-company survey.

Obviously, the phantom order program does not include plans for any new plants. NSRB is considering only existing capacity at this time.

Transformation—Details of switching over the ghost orders to actual orders have not been entirely worked out. However, the planners believe that if the potential contractor cooperates to the best of his ability, the paper orders in many cases could be transformed by means of a telegram or letter.

The contractor then could take the telegram or letter of intent to his local bank to arrange for financing if necessary, get his subcontractors started on making necessary parts and components, line up his own materials and personnel, get necessary physical changes in plant layout underway without delay.

Two Billion for Aircraft

TWO billion dollars worth of aircraft have been ordered by the Air Force and the Navy or are in the closing phase of negotiations, according to figures from the defense establishment.

The law providing for the expansion of the air arm, passed by Congress last summer, authorized the expenditure of $2,798,000,000 for aircraft. Of the total, the Air Force was to get $2,045,000,000 and the Navy $753,000,000.

Authorized by the President, is $1,345,000,000 for 2201 planes for the Air Force and $654 million for 1165 planes for the Navy. Records of the services show actual contracts have been placed by the Air Force totaling $1,005,000,000 and by the Navy totaling $458,000,000. However, the service's figures on contracts placed have not been totaled up lately and it is believed that contracts placed aggregate at least $2 billion.

In addition to planes, the Air Force is buying at least 5000 engines this year, contracts for a substantial number of which already have been placed with the four big aircraft engine builders.

Program Totals $14 Billion—Total defense program for the current fiscal year is estimated at around $14 billion dollars. This includes, of course, all expenditures for personnel, all supplies and equipment, including the hard goods. Currently, the aircraft program is of outstanding interest to the metalworking industries.

For the next fiscal year, high defense officials estimate the program will cost $17.5 billion, based on the present outlook. A substantial portion of the increase will go for building up the Air Force and the naval air arm.

Should the international situation worsen, this figure may soar sharply, defense officials admit.

New Casting Technique

Lebanon obtains license for British centri-die process for making alloy circular shapes

SECRET British super-alloy steel casting processes have been acquired by Lebanon Steel Foundry, Lebanon, Pa., and will be made available immediately in the production of turbojet engine components required in the half-billion dollar military aircraft engine program.

Lebanon has signed an agreement with Firth-Vickers Stainless Steels Ltd., Sheffield, Eng., for exclusive American use of the patented techniques developed by Firth-Vickers. These include the centri-die casting process which made possible the British jet engines. This technique of permanent mold centrifugal casting is described by William H. Worrilow, Lebanon president, as "the most important improvement in a generation of foundry progress in the casting of alloy steels."

Aside from its immediate importance to warplane engine manufacture, Mr. Worrilow believes the process holds promise in a variety of new industrial uses. It provides a way for the production of cylindrical and tubular structures of high heat and corrosion resistance.

Tool Sales Gain Seen

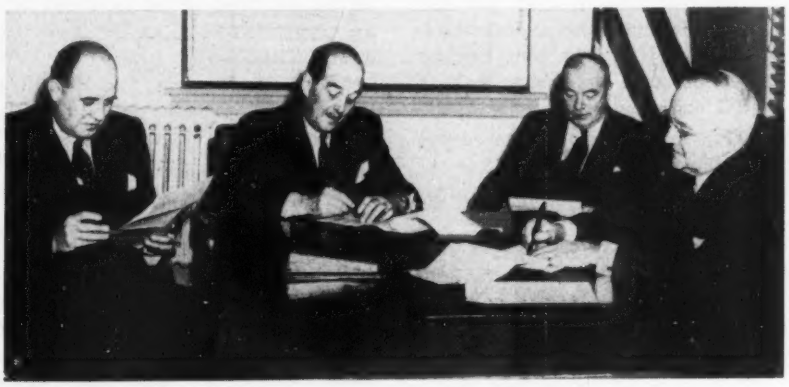
NEW orders for machine tools have dipped recently due to normal seasonal factors plus a general lack of confidence that is at present affecting some capital goods industries. The second half of 1948 got off to a slow start with the National Machine Tool Builders' Association July sales index at 74.5 per cent of the 1945-47 average.

Upswing in business throughout the fall is expected. Some projects that have been held in abeyance are being dusted off and are likely to be set in motion soon.

Automotive tooling may be a substantial factor in the tool market over coming months.

Defense Orders Small—Defense orders have not had any effect on the industry to date, with new orders ascribable to defense requirements amounting to no more than a trickle. Although a number of contracts have been let for new airplanes the plane builders are pretty well supplied with machine tools.

Foreign machine tool requirements, although expected to prove fairly sizable under the European Recovery Program, have not materialized to date. Foreign orders for July at 13.4 per cent of the 1945-47 average were equal to the average for the first six months of this year.



Hands-across-the-seas agreement bringing patented British casting process to America is signed at Lebanon, Pa. Shown, left to right, are: A. E. Thornton, associate director, and Carl E. Holmstrom, managing director for Firth-Vickers; T. S. Quinn, partner and treasurer, and W. H. Worrilow, president, Lebanon Steel Foundry

Favor German Scrap Plan

Government-sponsored corporation to serve as exclusive agency approved at OIC meeting

IT BEGINS to look as though steel manufacturers' and foundrymen's hopes that substantial tonnages of scrap will be available from the millions of tons of rubble in war-ruined Germany, at long last, will be fulfilled.

Over recent weeks several tonnages of German scrap have been received in this country and more are reported on the way. However, the movement to date has been only a trickle, shipments on a more substantial scale being prevented by marketing complications abroad.

Hopes Lifted—Last week it looked as though these marketing difficulties would be removed. At any rate, scrap consumers' hopes for early increase in the flow of German scrap here were lifted by approval of a plan to facilitate the movement to this country under government sponsorship.

Meeting with the Office of Industry Co-operation in Washington, some 300 scrap dealers voted for formation of a corporation to serve as exclusive American agency in buying scrap in Germany and importing it into this country. They approved an industry advisory committee to work with the Commerce Department in planning capitalization and other details of the corporation.

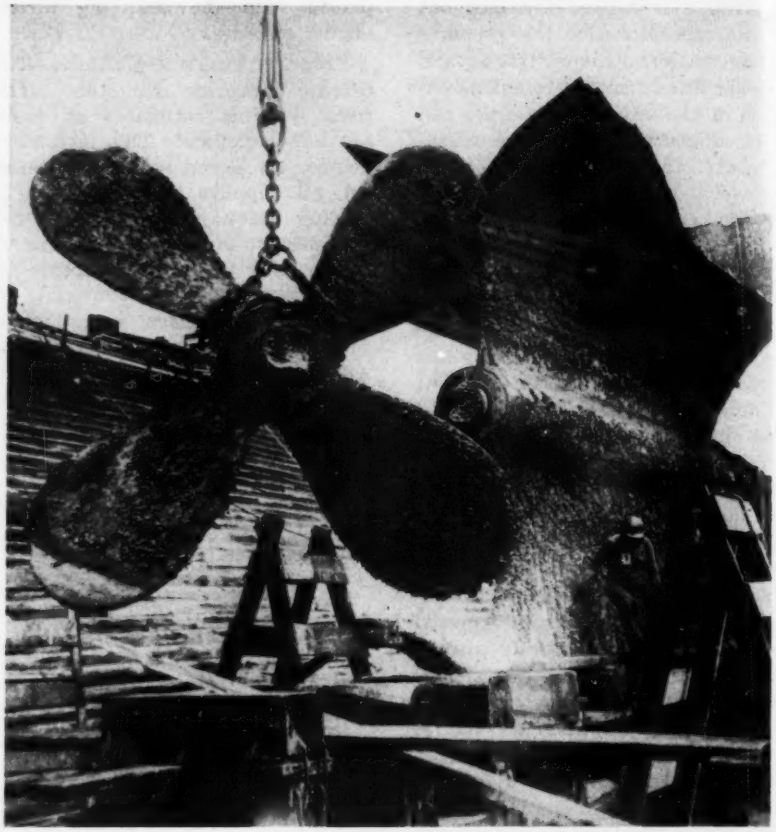
The plan calls for co-operative voluntary financing by scrap dealers. While the extent of the financing is not yet decided, it is expected to be at least $1 million which probably would suffice if the scrap were disposed of as rapidly as expected.

Prices Would Be Set—The corporation would buy German scrap at prices set by a bi-partite board headed by General Lucius Clay for the United States and General Robertson for the United Kingdom, plus loading and transportation charges as well as the usual commission.

The plan is to organize the corporation under public law 395. It is expected to take several weeks to plan all details and get approval of the Justice Department.

The scrap brought in from Germany would be sold by the corporation under allocations by the OIC to steel mills and foundries on the basis of need.

So that no one would be overlooked the OIC invited the approximately 3600 scrap dealers on the Bureau of Mines list to the meeting. Of the 300 who attended only 3 voiced objection to the plan, this being on the ground operation of a government-sponsored corporation would not be in tune with the American free enterprise system. These objectors, however, did not press their point.



SCRAP: Soon to become scrap for industry is this barnacle-encrusted, seven-ton cast iron propeller hoisted from a 278-foot cargo vessel being dismantled at New York. NEA photo

Embargo In Effect—Commenting on the price, Alex Miller, head of the OIC Ferrous Scrap Division, pointed out that the embargo against further scrap shipments from bizonal Germany continues in effect. This embargo was put in force when, after an agreement between the Americans and British on a price of $26 fas North German ports, the British advanced their price to $30 and refused to recede from their position. The British claimed Americans were offering $30 and more for German scrap.

The British have a single scrap buying agency in Germany so that creation of a single American agency should clarify the situation and enable General Clay to reach a firm price agreement with the British. But what this price will be, Mr. Miller had no idea. He thought, however, that the German scrap would be available at around the market price in this country.

Robert W. Wolcott, president of Lukens Steel Co., Coatesville, Pa., who recently returned to this country after investigating the German scrap situation for the Commerce Department, reported that the amount of German rubble scrap is larger than the previously estimated 10 million tons, and now is estimated at 15 million tons.

Start New England Scrap Drive

SIX-state drive to locate and channel some 100,000 tons of industrial scrap iron and steel to foundries has been launched in New England in an effort to offset the continuing shortage of pig iron which is threatening to force curtailment of foundry operations in the district.

The New England Council, which is the co-ordinating agency, pointed out that jobs of some 67,000 workmen are dependent on collection of a sufficient amount of scrap machinery, shafting, tools, dies, fixtures, etc., to tide over the foundries until the blast furnace of the Mystic Iron Works is restored to operation. This restoration is expected not later than Nov. 1.

Basing Point Legislation Sought

Campaigns under way aimed at effecting revision in existing laws now barring use of basing point pricing. Curb on Federal Trade Commission powers urged

CAMPAIGNS for national legislation to counteract government interference in pricing are under way.

One drive is that of Ernest T. Weir, chairman, National Steel Corp., Pittsburgh, who has armed his salesmen with letters asking the company's customers to induce Congress to pass legislation specifically saying the basing point pricing system like that long used by the steel industry is legal.

Another campaign is that of Associated Industries of Massachusetts, backed by representative New England industrialists, to obtain a revision of the Robinson-Patman Act to restrict the powers of the Federal Trade Commission.

Meanwhile, can manufacturers are protesting to steel producers the shift to mill pricing. They contend the action violates the "lowest competitive delivered price" clause in some contracts and the maximum prices stipulated in others.

Decision Destructive—In his letter Mr. Weir declares a recent Supreme Court decision against the basing point method of pricing is "thoroughly destructive" and points out former pricing methods were "evolved over long periods of time; they were the product of constant dealing between buyers and sellers and, as such, represent the most practical, efficient and mutually satisfactory method of doing business."

The court, he says, "wiped out these systems at the behest of bureaucrats and on a basis of theory which has never been proved by practical experience anywhere or at any time."

Announcing the move of the Massachusetts group, Roy F. Williams, executive vice president of AIM, warned that large-scale unemployment and wholesale abandonment of factories were imminent in New England states unless Congress acts to curb the FTC, specifically on basing point pricing matters.

Senate Group Asks Price Data

LIKE a doctor examining a patient, a Senate subcommittee is checking industry views to determine to what extent the nation's economy will be affected by recent decisions of the Supreme Court and rulings of the Federal Trade Commission concerning industrial pricing policies.

In making this examination, the Trade Policies Subcommittee headed by Sen. Homer E. Capehart (Rep., Ind.) is more than just feeling the pulse of industry and asking it what it thinks about pricing policies. The subcommittee is asking for facts and figures.

To obtain this information, the subcommittee has directed 13 questions to chambers of commerce and seven to trade associations.

Questions Summarized—Summarized, the 13 questions to chambers of commerce are designed to bring out the following information: 1. Basic industries in the various areas and their pricing systems.

2. Industries using raw materials bought on a delivered price basis or any other basis which is cheaper for the buyer than a mill price.

3. Breakdown as to industries that can and those that cannot sell all their normal production nearby and buy all their raw materials nearby.

4. Industries that will have to move out because of sales and purchasing disadvantages; number of employees affected, and investment in plant and equipment that will be obsoleted.

5. Whether industries will move in because changed buying practices leave a community with surplus of raw materials, and whether housing is available for influx of workers.

Trade Groups Quizzed—In substance, the information sought from trade associations is: 1. Extent to which various pricing systems are used by members in selling their products or buying materials.

2. Importance of the industry's products in the nation's economy.

3. Breakdown as to plant product-distribution to determine what regions depend on outside plants.

4. Effect of freight costs on industry's purchases of materials and sales of goods.

5. Extent to which plant pricing would increase sales for big companies with strategically located plants and hinder small companies with only a single plant.

6. Extent to which industry would be aided or harmed if prohibited from systematically absorbing freight to meet competition.

GE Steel Costs Up $8 Million

CHANGEOVER from the basing point system of pricing steel, together with increased freight rates and recent steel price advances, have added $8 million to General Electric Co.'s annual steel bill, according to Harry L. Erlicher, vice president in charge of purchasing and traffic.

Absorption of freight under the mill pricing system adopted by steel producers as result of the Supreme Court decision in the cement case will cost the company more than $500,000 yearly.

FTC Steel Hearing Resumed

FEDERAL Trade Commission's hearing of charges against the steel industry, alleging collusion and price fixing, was resumed last week with Lynn C. Paulson, FTC trial attorney, offering 24 revised charts showing steel producing mill locations and basing point locations that figured in 1947 steel business.

Attorney Paulson said that after acceptance of these charts by the trial examiner he would rest his case. However, attorneys for the steel companies objected to the charts on the ground they were not accurate, whereupon Paulson requested additional time to make them accurate. The hearing then was recessed until Sept. 16.

Manufacturing Income Rises

NET INCOME of all U. S. manufacturing corporations in the first quarter of 1948 exceeded that of the fourth and first quarters of 1947. The increase over the fourth quarter, according to the Securities & Exchange Commission and the Federal Trade Commission, came about because a drop in costs and expenses more than offset lower sales.

For the first quarter of 1948, net income after taxes totaled $2.9 billion, an increase of $300 million over the fourth quarter and $200 million more than the first quarter of last year.

Total sales for the first quarter of 1948 are estimated at $40.1 billion, about $1.1 billion less than in the preceding quarter.

Income Before Taxes—Net income before federal income taxes amounted to $4.6 billion, compared with $4.2 billion during the preceding quarter.

Total assets of all manufacturing corporations were about $100.6 billion as of March 31, 1948.

Rates of profit both in relation to investment and to sales were somewhat higher in the first quarter of 1948 than in the fourth quarter of 1947 and returned to levels that prevailed in the early part of last year. Related to sales, profits after taxes rose from 6.2 per cent to 7.2.

Completing New Mill

Columbia Steel's tin plate and cold-rolled mill at Pittsburg may be completed next month

COLUMBIA Steel Co.'s new tin plate and cold-rolled sheet mill at Pittsburg, Calif., will be completed in October, giving promise to western steel consumers that at least a part of their steel shortage will be alleviated.

Construction of the $25 million plant for Columbia, U.S. Steel's western subsidiary, has been under way since June, 1946. Construction, in addition to the rolling mill and its facilities, has included new administrative buildings, a boiler house, a machine shop, a store house, a filtration plant and a 600-foot dock for deep-water vessels and a 400 foot dock for barges.

Geneva Supplies Coils—Material in the form of coils will be supplied by U.S. Steel's Geneva plant in Utah. The mill has been in partial operation for several months, as the various units have been completed, in order to train personnel in operation of the equipment.

Construction of the mill and other structures required a large amount of steel. More than 21,000 tons of reinforcing and structural steel went into the plant, as well as 14,000 tons of machinery.

A similar rolling mill will be erected by Columbia at its plant at Torrance in southern California.

U.S. Pipe To Build California Unit

UNITED STATES Pipe & Foundry Co., Burlington, N. J., has purchased a 35-acre tract located at Richmond, Calif., as site for a plant to produce cast iron pressure pipe made by the centrifugal process.

This product is used in water works systems, sewage works, gas systems, oil refineries and chemical plants.

Equipment Dealers To Meet

EXECUTIVE committee of Associated Equipment Distributors, headed by President A. F. Garlinghouse, Los Angeles, will meet in Denver, Sept. 29 and 30 to consider problems of the construction equipment industry.

The executive committee meeting will be followed on Oct. 1 and 2 by the regional conference for Region XIV, which encompasses Colorado, Utah, Wyoming and New Mexico, as well as El Paso, Tex. R. L. Arnold, Arnold Machinery Co., Salt Lake City, will direct this meeting, which will also be held at the Brown Palace Hotel in Denver.

Republic Making Improvements

REPUBLIC Steel Corp. will electrify its Youngstown bessemer plant, John H. Graft, district manager, announced last week. The project is part of Republic's multimillion dollar program for modernizing the district's operating facilities. Recently the company expended $20 million to $25 million on its Warren, O., and Youngstown plants.

Mr. Graft said two 6000 hp motors are being installed to replace a steam engine driving the 22½-in. and 19-in. billet mills. Later, other equipment will go in until the big steam boiler plant may be abandoned.

The plant is one of the world's largest bessemer operations, rated at 700,000 tons of ingots yearly.

Republic recently started work on a new by-products coke battery estimated to cost nearly $5 million. It also is building two coke batteries costing nearly $10 million at Warren, O.

Dedicate New Laboratory

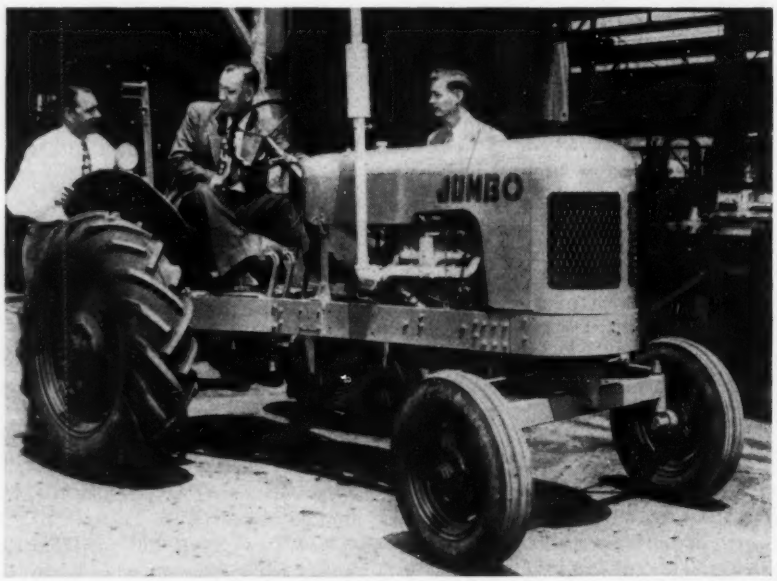
GENERAL Electric X-Ray Corp. dedicated its new William D. Coolidge Laboratory in Milwaukee on Sept. 13. More than 500 distinguished visitors participated in the ceremonies honoring Dr. William D. Coolidge, director emeritus of General Electric's Schenectady, N. Y., research laboratory, known throughout the scientific world as the "father of the modern x-ray tube" and holder of 83 patents.

Program began with an inspection of the laboratory which is the largest of its kind in the world and represents the culmination of an expansion program launched more than two years ago by the corporation. Addresses during the dedication ceremonies were made by Gov. Oscar A. Rennebohm of Wisconsin, J. H. Clough, president, General Electric X-Ray Corp., Dr. A. C. Christie, Georgetown University, Dr. William D. Coolidge, Charles E. Wilson, president, General Electric Co., and J. H. Smith, executive vice president, General Electric X-Ray Corp.

Expects Higher Production

BOOKING of additional business will necessitate higher production schedules for the balance of Lakey Foundry & Machine Co.'s fiscal year, stated J. O. Ostergren, president, in a report to the stockholders covering operations for the nine months ending July 31 of the Muskegon, Mich., firm.

Production in the quarter ended July 31 was somewhat lower than in the preceding three months, the report continued, reflecting difficulties encountered by some customers in securing materials and parts, slackened demand by other customers and labor difficulties in the remaining cases.



NEW ADDITION: Introduction of this new heavy-duty tractor gives Jumbo Steel products Co., Azusa, Calif., a complete line of western-made farm machinery. Initial output is to be 350 per month. Much of the production is expected to be exported

Sales Policies Revamped

Changed market conditions reflected in mill actions on stainless steel and consignment pipe

CHANGING market conditions have brought new policies in steel mill sales to warehouses. Affected are stainless steel and pipe.

The change with respect to stainless eliminates certain discounts mills have given warehouses. Although some of the leaders in stainless production have altered their policies, the changes are not identical. Also not all producers of stainless have made revisions.

One producer has discontinued all discounts on stainless steel sold to warehouses, while another producer has removed discounts only from stainless sold for stocks at warehouses.

Policies Made Uniform — Removal of discounts brings stainless steel sales policies into line with other steel, such as carbon, on which there is no discount for a sales incentive. Discounts, originally instituted to encourage sales of stainless by warehouses, are deemed by several companies as no longer necessary in view of that product's growth in popularity and demand.

The producer which removed discounts from stainless sold for stocks at warehouses still gives discounts on stainless sold by a warehouse but to be delivered directly from mill to end-user. Such a provision, it was pointed out, gives a warehouse an opportunity to take orders for almost any of the analyses, shapes and sizes of stainless steels, the number of which is so great that many of the less popular ones are not stocked by warehouses. This, it was added, enables the servicing of a small consumer who ordinarily would not be contacted by mill representatives.

Service Discount — For servicing the consumer, the warehouse will continue to receive a discount. In effect, the consumer whose stainless is delivered directly from a mill even though ordered through a warehouse will get a lower price than if the product had come out of warehouse stocks. The producer said it feels the consumer should not be charged for warehousing a product that went directly from the mill to the consumer.

However, if stainless is warehoused, the consumer should pay for the warehousing of it, just as he would if the product were carbon steel, the producer said.

The new policy, however, was looked upon unfavorably by some warehousemen who feel it is a move that will take business away from them.

Consignment Pipe—The change in sales policy with respect to pipe, as revealed by one producer, eliminates consignment of pipe by mill to warehouses. The consignment policy was designed to assist warehouses in selling pipe during previous years when the supply of that product was greater than demand. Under the consignment method a warehouse whose finances might not have been sufficient to permit it to carry a complete line of pipe was provided stocks of pipe by the mill, the latter at the end of each month receiving payment for pipe sold.

The consignment policy, which involved considerable bookkeeping, is currently not needed because demand for pipe is so great that very little has to be warehoused, said the producer.

Harvester Increases Prices

INTERNATIONAL Harvester Co., Chicago, increased prices Sept. 7 on farm implements, farm tractors and industrial power products.

The advances, the company said, were necessitated by a recent wage increase to employees, and increased prices of steel, coal, pig iron and other basic materials, components, and transportation. Increases on the farm tractor line average about 9 per cent. In some cases, higher percentages of increase were applied to other products where the profit margin was low or actually showed a loss. A few products are still in a loss position, the company said.

Management Training Experiment

AN UNUSUAL experiment in labor-management relations—participation by foremen in company-union negotiations — was conducted successfully during recent negotiations with the International Association of Machinists at the Hornell, N. Y., pillow block plant of SKF Industries Inc.

During the course of negotiations, which were successfully concluded following certification of the IAM as bargaining agent for hourly-paid employees, each of the plant foremen was given an opportunity to attend at least one session of the meetings between the company and the union.

Prior to negotiations in 1947 with the United Steelworkers of America on an agreement covering its plants in Philadelphia, the company invited foremen to submit ideas for contract changes.

Contract Limits K-F

Amounts of iron available from Cleveland furnace specified. Foundries' legal action pends

TONNAGE of foundry grade iron which Kaiser-Frazer Corp. can obtain from Republic Steel Corp. under the contract covering operation of a government-owned Cleveland blast furnace, over which there has been much controversy recently, is limited.

Republic is to furnish K-F, if the latter desires it, basic iron in pig iron form, representing the lesser of 5000 net tons a month or one-half of the government-owned furnace's output in excess of 28,000 net tons a month.

In lieu, however, of any portion of the pig iron to which K-F will be entitled, it may specify up to a maximum of 1000 net tons a month of pig iron of foundry grade. In furnishing any of this tonnage of foundry iron, however, Republic will make delivery at the rate of one net ton in lieu of 1 15/100 tons of basic pig iron.

Thus, if K-F took the maximum of 1000 tons of foundry iron it could get not more than 3850 net tons of basic iron a month.

At Market Price — Sale of both foundry and basic iron to K-F under the contract is to be made at market price f.o.b. the producing plants in Cleveland.

It was indicated at Republic Steel that shipments of merchant iron to foundries would not be affected by any of the foundry iron tonnage K-F may take. Republic would reduce its own basic iron production to allow facilities to make enough foundry iron to replace the tonnage taken out by K-F.

Foundries, which protested interference with their iron supply by transfer of the government-owned furnace, won a temporary victory, but are still considering legal action to gain long-time assurance of continued iron supplies. The approximately 400 foundries who are merchant iron customers of Republic Steel have engaged the Cleveland law firm of Miller & Hornbeck, which is now checking into all angles of the situation. However, no legal action had been filed by last week.

Former Acme Official Dies

FREDERICK C. Gifford, former executive and director of Acme Steel Co., Chicago, died at his summer home at Delavan Lake, Wis., Sept. 4. He was first vice president of Acme Steel when he retired in 1941 because of ill health.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

Wisdom of union's demand for outright repeal of Taft-Hartley Action questioned. Ball committee may recommend provisions to make law tougher than at present

ORGANIZED labor's total opposition to the Taft-Hartley Act is a little puzzling to many observers here.

Union leaders present a united front in demanding outright repeal of the law. Conspicuous by absence are suggestions from labor spokesmen for ironing out the rough spots or inequities of the act. The unionists do not want amendments or reform of the law. They just want repeal.

As a matter of fact, proposals for amending the act to make it more favorable to organized labor are brushed off. Apparently the union brain trusters believe there is a greater chance for the act's repeal if it is not modified.

President Truman and his administration have hewed to the union line on this. Labor Day speeches and statements by the administration from the Chief Executive on down all advocated outright repeal. In return, important unions have pledged their support to Truman in the fall elections.

Wisdom Questioned — Many question whether this policy by the union leaders and the administration is for the best interests of the labor movement. Chances for outright repeal of the law are considered exceedingly dim.

The Republican platform contains a plank supporting the law. The Democratic platform calls for repeal. The betting odds on a Republican victory in November are heavy.

But even in the unlikely event that Mr. Truman should be re-elected and the Democrats should gain substantially in Congress, the chances for Taft-Hartley repeal would still be slender. After all, 126 Democratic senators and representatives voted to override the President's veto of the law in June, 1947. Indications are that many of these Democratic congressmen have not changed their attitude toward the labor law, despite the Democratic plank favoring repeal.

Reform Possible—In view of the political situation, impartial observers believe that the unionists are working against their own interests in plugging for outright repeal. Rather they think the labor leaders should work for amendments to the law to remove some of the provisions objectionable to labor. Such compromise proposals might have a chance at adoption.

As a matter of fact, the unions could win some support from employers on proposals for some changes in the act that would help labor. Many employers, for example, would look kindly on union security provisions in contracts; some favor a union or even a closed shop.

Alterations Coming—Whether the unions like it or not, some far-reaching changes in the act are likely to result during the next session of Congress. The socalled "watchdog" committee headed by Sen. Joseph Ball (Rep., Minn.) will report to Congress Mar. 1 on the operation of the law during its first year and a half and will recommend changes in the act.

Present thinking of the committee presages a tougher labor law than that now in effect.

Among changes receiving favorable consideration by the Ball committee are the following:

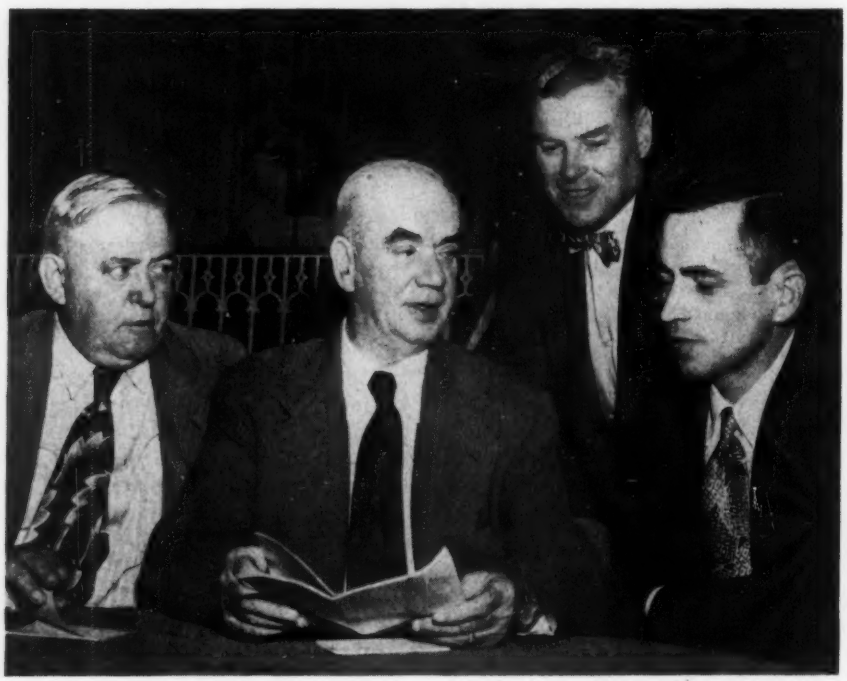
Unions may be required by the National Labor Relations Board to pay willing workers for time lost during strikes.

Collective bargaining to determine employer contributions to welfare funds may be banned or restricted.

Strikes to compel employers to sign contracts in violation of the T-H law may be outlawed.

Protection for persons testifying against a union or its officials or filing charges against a union may be provided.

More union officers may be required to sign anti-communist affidavits.



CIO officially will support the Truman-Barkley ticket this fall. In return, the Democrats support the union demand for Taft-Hartley Act repeal. Shown here are CIO officers, left to right: Allen S. Haywood, Philip Murray, David McDonald and James B. Carey. NEA photo

Government Adds Employees

AN AVERAGE of 482 new workers were added to the federal payrolls each day in July, according to Sen. Harry Byrd (Dem., Va.), leading critic of government bureaucracy. This represents a slight slowing in the growth of federal payrolls; in seven previous months, the daily average employment increase was 525.

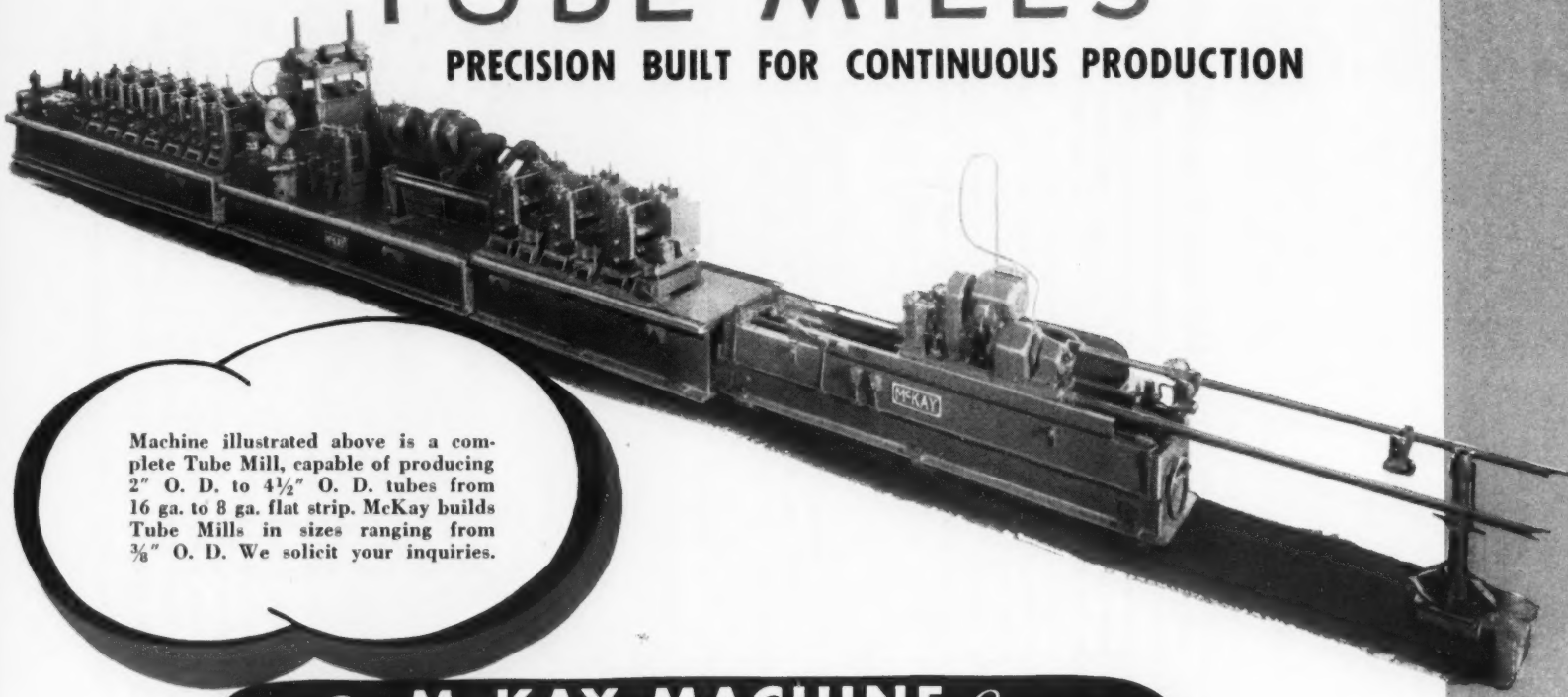
Civilian government employees totaled 2,107,244 on July 31, a gain of 111,856 since the beginning of the year.

Greatest gain was shown in the

McKAY

RESISTANCE WELD TUBE MILLS

PRECISION BUILT FOR CONTINUOUS PRODUCTION



Machine illustrated above is a complete Tube Mill, capable of producing 2" O. D. to 4½" O. D. tubes from 16 ga. to 8 ga. flat strip. McKay builds Tube Mills in sizes ranging from ⅜" O. D. We solicit your inquiries.

The **McKAY MACHINE** *Company*

ENGINEERS AND MANUFACTURERS OF SHEET, TIN, AND STRIP MILL EQUIPMENT

YOUNGSTOWN, OHIO

ASSOCIATED COMPANY

The WEAN ENGINEERING CO., Inc. • WARREN, OHIO

McKay Electric Resistance Weld Tube Mills can be put to work quickly and easily in your plant. Your present dependable personnel, after instruction, will become entirely competent to operate a McKay mill.

This has been accomplished by:

1. **Simplifying and centralizing all necessary controls.**
2. **Complete protection through approved safety devices and interlocks.**
3. **Supplying motor drives and push button controls to essential heavy duty motions.**
4. **Eliminating necessity of welding from coil to coil — strip from coil threads itself through machine, without manual assistance.**
5. **Automatic Rotary Head Cut-off (patent pending) producing lathe cut and accurately maintaining desired lengths.**
6. **Providing simple, easy means of changing rolls for other tube sizes.**
7. **Typical rugged McKay construction insures high production with a minimum of maintenance.**

Post Office Department which has added 43,784 employees this year. Other sizable increases were made by the military establishment, the Veterans Administration and the Department of Agriculture.

Replaced Strikers Denied Vote

WORKERS on strike for higher pay may not vote in collective bargaining elections if their jobs have been filled. The replacements may vote, instead of the strikers, on which union shall represent them.

This was the ruling handed down by the National Labor Relations Board last week, reversing an earlier ruling under the old Wagner Act permitting strikers and their replacements to vote.

The ruling has been protested by CIO attorneys who hold that it permits strike breakers to vote on bargaining units.

Steel Probe Continues

INVESTIGATION of steel gray markets and other questionable trade practices is being continued by the Macy subcommittee of the Senate. E. R. Ferguson Jr., attorney for the committee, says that although the group is now looking into a local automobile situation in Washington and is investigating textile markets operations in the steel markets are being watched carefully and that a number of situations may come up for public hearings in the near future.

Political Note

LUNCHEON table conversations in Washington these days are likely to turn to speculation on probable cabinet selections by Governor Dewey in event he wins the presidency in November.

One such chat reveals some support for Sen. Homer E. Capehart of Indiana as Secretary of Commerce. Senator Capehart soon will take the spotlight as chairman of the Committee on Trade Policies, which is investigating the effects of recent court rulings outlawing the basing point system of pricing.

ECA Grants Near $1.5 Billion

NEARLY $1.5 billion in European recovery program grants have been approved by the Economic Co-operation Administration. The program for the first six months calls for $2 billion in grants and $500 million in loans. Current rate of approval for grants is $19 million daily and is being stepped up as the program progresses. Loans are being made more slowly and it is doubted if the scheduled half-billion in loans will be made during the first six months.

ECA Goods To Carry USA Emblem

AMERICAN-MADE goods shipped to beneficiaries in the European Recovery Program will carry stars and stripes emblem to emphasize who supplied the material. The emblem will bear the phrase: "For European Recovery, supplied by the United States of America."

The phrase will appear wherever possible on shipping cases and packages as well as on the goods themselves.

ECA hopes such marking of goods not only will emphasize to Europeans the extent of the help being granted by the United States, but also will help prevent misdirection of recovery supplies and help administrators in following the goods and checking their end use.

State Taxes Rise

STATE governments collected a total of $7.9 billion in taxes during fiscal 1948, an increase of more than $1.1 billion over the preceding year. No state registered a decline in revenue. Collections in 1948 were more than double collections in prewar 1940.

The increases were caused by new sales, excise and general levies in some states and by the increase in economic activity.

Guide Against Depression

DON'T overbid the prices of scarce materials, components or labor. This is a high-point in the advice to businessmen contained in a 16-page booklet published by the U. S. Chamber of Commerce to warn business and industry to guard against the effects of a possible depression.

In issuing the booklet, the chamber is careful not to predict that a depression is coming, but cautions business to watch for danger signals and storm warnings to prevent another boom-bust cycle.

Included are these admonitions:

Watch for over-expansion.

Plan to minimize layoffs for regularizing production to the greatest possible extent.

Watch rising interest rates.

Don't be misled by deceptive boom-time inventory profits.

On reading the signs, the chamber says: "There is no easy rule-of-thumb. In a dynamic free economy there are no enduring normal relations."

Road Construction May Hit Peak

AMERICA'S highway construction program should reach an all-time high of $1,750,000 in 1948, according to Charles M. Upham, engineer-director of the American Road Builders' Association.

"October is our peak construction month," declared Mr. Upham. "In October, 1946, $100 million was spent in road building. Last October this rose to $178 million. At this rate October, 1948, should show a total expenditure of $250 million."

Yearly ratios show practically the same increases—from $772 million in 1946 to $1,500,000 in 1947.

Federal Works Agency reports contracts by state highway departments for the first five months of this year amount to 38 per cent more than the corresponding period of 1947. Federal

NEW: This new Naval plane, the XAJ-1, for carrier operation has successfully completed its initial flight tests. Built by North American Aviation Inc., Inglewood, Calif., the plane combines two reciprocating engines under the wings with one turbojet engine in the tail of the fuselage. Performance figures are not available but it is said the plane is considerably faster and carries a heavier load than present carrier types

Steel Hits Europe's Revival

Raw steel scarcity chokes production expansion by metalworking and other industries

STEEL is the main chokepoint standing in the way of an expansion in production by European metalworking and other industries, but scarcity of suitable quality coke, in turn, is the limiting factor in steel output. The steel shortage is the result of greater requirements, rather than of a fall in production, according to a survey by the Department of Commerce.

The crude steel output of European countries, excluding Germany and Russia, amounted to some 27,500,000 tons in 1946 and 31,500,000 tons in 1947, production in the latter year exceeding that for 1938 by 7 per cent. Production for 1948 can be expected to rise to no less than 38,500,000 tons (taking into account the prospective increase in exports of metallurgical coke from Germany), but even so it will fall short of the original targets of the European nations by about 5 million tons.

Coke Shortage — This deficit measures the extent to which the shortage of coke, and scrap to a lesser extent, inhibits steel production. The coke deficit alone may be estimated at some 3 million tons for 1948. German output appears to be the only means for bridging the gap, but Ruhr coke production continues to be disappointing. The scrap shortage is partly a reflection of the scarcity of metallurgical coke.

Coal position is slowly improving, however, and this factor is one which influences the Department of Commerce to estimate the following reduced deficits in European steel production for the next few years: 2 million tons in 1949, 1.5 million in 1950 and 1 million in 1951. Thus, crude steel output in Europe will be 10 per cent below requirements for the next four years in Europe, while the availability of finished steel (taking into account overseas imports) may be 7-10 per cent lower than the original targets.

Sheets, Other Items Short—Among the steel products, there are particularly acute shortages in sheets, tin plate, transformer and dynamo sheets and seamless tubes. These shortages, however, are of a fairly temporary character. The new sheet mills, which will come into production from 1950 onwards, will rapidly eliminate the deficit there, and the same is true of transformer sheets and seamless tubes. In tin plate, an improvement cannot be expected in European production until after 1951, but thereafter new capacity will come into operation.

GOING UP: A small automobile is lifted up to the roomy interior of the C-74 Globemaster as the mammoth U. S. Air Force cargo carrier stops at a German airport. The giant plane, giving a powerful boost to the Allied air lift, carried heavy machinery, including a rock-crushing plant, to Berlin. NEA photo

Czechoslovakia

ESTIMATED output of steel ingot, not including castings, for the first half of 1948 is 1,323,155 metric tons; in the corresponding period of last year the production was 1,141,000 tons, including castings. For pig iron the output for the first six months of the year was 816,215 metric tons in 1948 and 701,000 tons in 1947.

The Skoda works are to deliver a number of locomotives to Yugoslavia, and some orders are being dealt with for Argentina. These works are also building cranes for the Polish ports.

France

RECENT review of the French economic problem by the finance minister emphasizes that agriculture, not manufacturing, should be developed to become the first export industry of the country. The report also indicates that imports from areas outside the French Union should be gradually whittled down so that eventually only those raw materials that cannot be found in France or French colonies will be imported.

The report advocates complete overhauling of the French taxation system, to put the nationalized industries on a paying basis, to reduce the cost to industry of the National Social Security System, to create and maintain long-term confidence in the French currency and to keep the budget balanced. Organized labor will probably provide the first obstacle to the new government's economic planning. The Communist-dominated federated trade unions (C.G.T.) are expected to present new wage demands on a large scale by the end of this month.

Italy

SIGNS of depression in Italian heavy industries have been reported, as well as a trend toward lower prices. There are renewed demands for higher wages. Current estimates place Italy's steel output for this year at 2 million metric tons.

Netherlands

EXPORTS of pig iron during the first quarter of 1948 were 61,050 tons, of which 8300 tons went to the

United States. Switzerland took the largest tonnage, with 14,850. In June the Netherlands imported a record amount of iron and steel products, amounting to 115,500 tons. Some of the imports came from Germany.

Stork Bros. & Co., Amsterdam, plans a new rolling mill and will mechanize a foundry at its Berg-op-Zoom works.

Japs Get British Columbia Ore

BRITISH Columbia's hopes for an integrated iron and steel industry have been given a serious setback by signing of a contract for delivery of 250,000 tons of British Columbia iron ore to Japan.

Sale of the ore was made by Puget Sound Iron Co., of San Francisco to the Japanese Board of Trade, and the transaction is being handled by China Mutual Trading Co. of Seattle, Wash.

Source of the ore is Texada Island, B. C., where the San Francisco company owns deposits which have been variously estimated as containing from 250,000 to 4,372,000 tons of ore.

Ship Large Tonnage—According to present plans, the ore will be shipped at a rate of about 50,000 tons a month. Thus every month for the next five—possibly longer if the contract is renewed—British Columbia will lose a tonnage equal to the annual tonnage of steel consumed in the province.

Before shipments can be started, the Texada Island mine will have to be re-opened—it is idle now—and new mining equipment will have to be added. In addition, a deep-sea wharf will have to be constructed. Charter of 25 ships to transport the ore is being planned.

For a number of years, British Columbia industrialists have been promoting the idea of an iron smelter to use British Columbia ores. It is believed that as the steel industry in the province expands, a smelter eventually will be constructed. However, should the exports to Japan deplete the ore supply seriously, hopes for a smelter will be blasted.

Three Firms — At present British Columbia's steel industry is centered in three firms, all of which have been expanding. They are the Pacific Bolt Mfg. Co., Vancouver Rolling Mills Ltd. and the electric furnace of the former British Columbia Tube Works plant.

Japan To Import Chinese Ore

JAPANESE government's Board of Trade has contracted with a private Chinese supplier to import 200,000 metric tons of iron ore from the mainland of China for the production of pig iron, SCAP's Foreign Trade & Commerce Division has reported.

The ore will be the first shipped to Japan from China proper since the end of the war. Imports have already been received from the Chinese island of Hainan off the southeastern coast of China. Deliveries of the mainland ore will be made over a six-month period, with the first shipment scheduled to arrive Sept. 15.

Facts for Industry . . .

Malleable Castings

Malleable iron casting shipments during June totaled 81,747 short tons, an increase of 7 per cent over the May figure. Of the total 48,113 tons, amounting to 59 per cent of the month's shipments, went to outside trades with the remainder going for the producers' own use. New orders booked during the month, less cancellations, for castings to outside trades amounted to 35,320 tons, 3 per cent above the orders booked during May. Unfilled orders of mallable iron castings for sale at the end of June amounted to 178,760 tons as compared with 191,553 tons at the end of the previous month. *Census Bureau, Commerce Dept.*

Metal Cans

In terms of steel consumed in their manufacture, shipments of metal cans in May amounted to 219,356 short tons. This represented a 5 per cent increase over April shipments and a 6 per cent increase over the like month last year. Food can shipments were up 11 per cent over April, whereas nonfood cans were practically at the same level during both months. Metal cans shipped for sale to the trade amounted to 174,830 tons, representing 80 per cent of total shipments. Remaining 20 per cent of the total steel used went for cans utilized by the producing companies, their parent companies, subsidiaries or affiliated companies for packing their own products. *Census Bureau, Commerce Dept.*

Steel Castings

Shipments of steel castings during June totaled 152,894 short tons, 7 per cent above May. This increase is attributed in part to the fact that there were more working days in June. Steel castings shipped for sale during the month increased 7 per cent to 117,794 tons which was 77 per cent of total shipments. Shipments of steel castings for manufacturers' own use rose 11 per cent over the previous month's total. Unfilled orders for sale to the trade at the end of June amounted to 469,973 tons, drop of 3 per cent from orders on books at the close of the previous month and represented a backlog of 4 months' shipments at the current rate of activity. *Census Bureau, Commerce Dept.*

Steel Forgings

Commercial steel forging shipments in June totaled 119,532 short tons, 10 per cent above May volume. Total for first 6 months of 1948 stands at 708,713 tons which is 17 thousand tons higher than the total for the corresponding period in 1947. Unfilled orders for steel forgings on June 30 amounted to 640,747 tons, slightly above orders on the books at the end of May. Drop and upset forging shipments stood at 83,366 tons, 10 per cent over May shipments and unfilled orders totaled 529 thousand tons, about a 6 months' backlog at the present rate of activity. Press and open hammer forging shipments were up 11 per cent over the previous month, totaling 36,166 tons. Unfilled orders at the end of June amounted to 112 thousand tons, representing more than 3 months' backlog. *Census Bureau, Commerce Dept.*

Stokers

Factory sales of mechanical stokers in June totaled 8135 units, an increase of 23 per cent over May sales. The number sold during the month was also 33 per cent above sales in June, 1947. Residential type units and those sold for use in small apartment houses and small commercial heating plants accounted for 91 per cent of the total sold during the month. *Census Bureau, Commerce Dept.*

New Tax Policy Urged

Measures to strengthen national economy advocated at Portland, Oreg., meeting of ASME

MEASURES to strengthen the national economy and give impetus to new industry and free enterprise were called for last week by Dr. Wilson M. Compton, president, State College of Washington, addressing the American Society of Mechanical Engineers holding its fall meeting in Portland, Oreg.

"Big government, big industry, big labor, big agriculture, even big science—none of them want to give up what they regard as their gains," he said. "These so-called gains are illusory and will be transitory unless they are coupled with: 1—A forthright plan for the orderly payment of the national debt, as an indispensable means of fortifying the whole structure of national finance; 2—a national system of income taxation which will enable the government to pay its way without permanently retarding production, new industry and new enterprise. If this means continuing heavy income taxation it at least has the lessons of history behind it."

Gas Turbine Locomotive—Design for a 3000 hp oil-burning gas turbine locomotive with maximum speed of 150 miles per hour was described at the meeting in a technical paper by Walter Giger, consulting engineer, Allis-Chalmers Mfg. Co.

Mr. Giger said higher speed is obtained without reducing safety of operation by lowering the center of gravity and reducing weight as well as streamlining proposed passenger cars. The low weight of these cars and of the gas turbine locomotive, he said, results in cheaper vehicles that can with safety be operated at higher sustained speeds than is the case with presently used standard railroad equipment.

Only one gas turbine is in operation so far and a few more are under construction here and abroad including two coal-burning gas turbine locomotives for Bituminous Coal Research Inc. According to Mr. Giger, the coal-burning gas turbine, so far as fuel cost is concerned, will be the cheapest to operate.

Allis-Chalmers also had made a study of a 4000 hp oil-burning gas turbine locomotive of novel design.

More than 500 engineers attended the 4-day meeting, technical sessions being held at Reed College. Subjects discussed included power and hydraulics, petroleum, wood industries, aviation, materials handling, light metals, engineering education and management.

Steel Held Key to Oil Output

INCREASED steel supply will provide the key for higher oil output, according to William J. Murray Jr., a member of the Texas Railroad Commission, who recently spoke before the Interstate Oil Compact Commission in New York.

As an example, he pointed to the current waste of casinghead gas which is now being burned in flares at the rate of 1.5 billion cu ft daily for want of storage space. Steel is particularly needed for this purpose, he said, and also for butane gas storage during the low-demand summer months, for the erection of conservation plants which will pump gas or water back into oil reservoirs to increase secondary recovery and for casing to drill exploratory and development wells.

Welding Papers Get Awards

PRIZE awards for the best papers on resistance welding topics submitted in the 1947-48 national contest have been announced by a jury of awards of the American Welding Society. All prizes were donated to the AWS by the Resistance Welder Manufacturers' Association.

First prize winner in the Industrial Division of the contest was Frank G. Harkins, Solar Aircraft Co., San Diego, Calif., who was presented with $750 for his paper on "Spot Welding Schedules for Nickel and Nickel Alloys." First prize in the University Division of the contest went to W. F. Hess, W. D. Doty and W. J. Childs, all of Rensselaer Polytechnic Institute, Troy, N. Y., for their paper on "Heat Treatment of Spot Welds in Steel Plate."

Shop Practices Survey Made

SHOP practices in the heavy plate industry recently were made the subject of a survey and report by the Steel Plate Fabricators Association, Chicago. The survey, covering the whole United States, embraces reports from 137 shops with 40,819 employees.

Because practices vary in different sections of the country, the United States is divided into eight geographical zones, and each zone is tabulated individually. The eight zones are then consolidated in a grand summary. Thus, any given shop is able to compare its practices with those of other shops in the same locality as well as with those in other localities or the nation as a whole. Company names are omitted; each has a confidential key number. All of the companies which participated in the survey have been furnished a copy of the final report.

Shop practices covered in the survey are: Holidays observed—with and without pay; vacations with pay; overtime and rates of pay; shifts and differential pay; rest, lunch and clean-up periods on company time; pre-employment medical examinations; periodic physical examinations; procedure for paying foremen; incentive systems; annual profit sharing plans; insurance and benefit plans; and types of labor contracts.

Calendar of Meetings . . .

Sept. 13-17, Instrument Society of America: Third instrument conference and exhibit, Convention Hall, Philadelphia. Society headquarters are at 1117 Wolfendale St., Pittsburgh.

Sept. 20-25, American Mining Congress: Metal mining convention and exposition, San Francisco. Congress headquarters are in the Ring Bldg., Washington.

Sept. 23, American Iron & Steel Institute: Regional technical meeting, Hotel William Penn, Pittsburgh.

Sept. 27-Oct. 2, Society of the Plastics Industry: Third national plastics exposition, Grand Central Palace, New York. Society headquarters are at 295 Madison Ave., New York.

Sept. 28-30, Porcelain Enamel Institute: Institute is one of sponsors of first international congress on porcelain enameling, London. Institute headquarters are at 1010 Vermont Ave., N. W., Washington.

Sept. 28-30, Association of American Railroads: Convention, Antlers Hotel, Colorado Springs, Colo.

Sept. 28-Oct. 1, Association of Iron & Steel Engineers: Annual convention and exhibition, Public Auditorium, Cleveland. Association headquarters are at 1010 Empire Bldg., Pittsburgh.

Sept. 29, American Iron & Steel Institute: Regional technical meeting, Hotel Cleveland, Cleveland.

Oct. 1-2, Southern Ohio Section of Open Hearth Committee, Iron & Steel Division and Ohio Valley Section, AIME: Annual fall meeting, Deshler-Wallick Hotel, Columbus, O.

Oct. 4-7, American Institute of Steel Construction Inc.: Twenty-sixth annual convention, Chateau Frontenac, Quebec, Canada. Institute headquarters are at 101 Park Ave., New York.

Oct. 4-7, Industrial Packaging Engineers Association and University of Illinois: First annual industrial packaging and materials handling short course, Sherman Hotel, Chicago. Association headquarters are at 20 W. Jackson Blvd., Chicago.

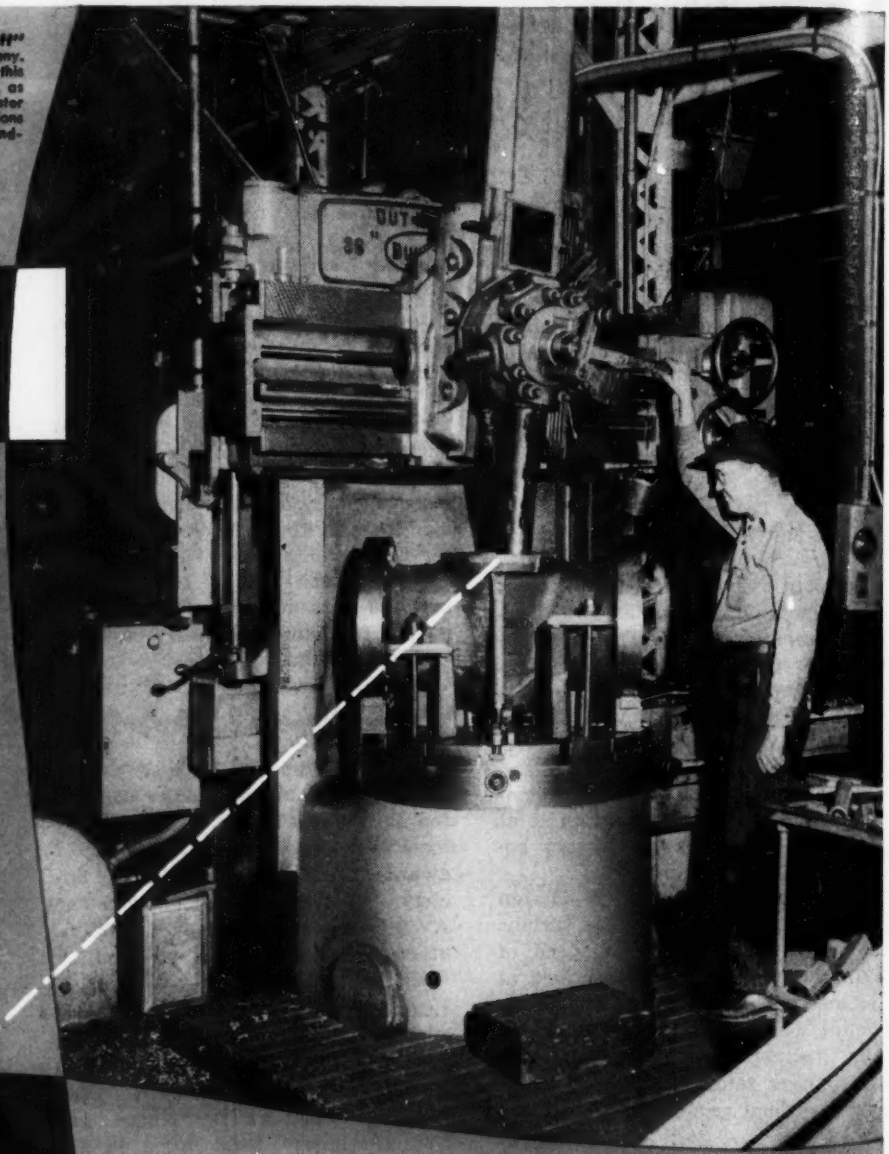
Oct. 5-7, Industrial Packaging Engineers Association: Show at Hotel Sherman, Chicago. Association headquarters are at 20 W. Jackson Blvd., Chicago.

Oct. 5-7, American Institute of Electrical Engineers: Middle eastern district meeting, Washington. Institute headquarters are at 33 W. 39th St., New York.

Oct. 5-9, Concrete Reinforcing Steel Institute: Twenty-fourth semi-annual meeting, Grove Park Inn, Asheville, N. C. Institute headquarters are at 38 S. Dearborn St., Chicago.

Oct. 7-8, Society for Advancement of Management: Fall training conference at Illinois Institute of Technology, Chicago. Society headquarters are at 20 N. Wacker Dr., Chicago.

This BULLARD 36" Cut Master is "really paying off" at Newport News Shipbuilding & Drydock Company. Here you see it taper boring a large valve. On this job, it also faces the flange and counter bores, as shown on the cross-sectional drawing. The Cut Master not only saved 33⅓% on these three operations but also provided such a smooth finish that a grinding operation was eliminated.

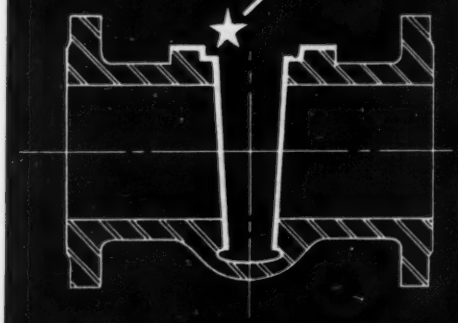


PERFORMANCE REPORT FROM NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY

CUTS COSTS 2 WAYS ON CAST STEEL VALVES with a 36" BULLARD Cut Master

1. SAVED 33⅓% ON 3 OPERATIONS

2. ELIMINATED A GRINDING OPERATION



Cross sectional drawing of valve with heavy lines indicating machined surfaces.

You, too, can expect savings on most of your jobs. It's easy to see why: The bed is cast in one heavy, rigid piece. Spindle is firmly supported top and bottom by large Timken roller bearings. Screw feeds provide and maintain a high degree of machining accuracy.

OTHER COST-CUTTING ADVANTAGES

Because the BULLARD Cut Master was designed specifically to save time on and between cuts, you find other unique features. The rapid and positive speed selection with the BULLARD pendant type control, limit-stops for simplified dimensional duplication, and centralized operating controls speed up operations and conserve costs. For complete description of these and other distinctive features, as well as data on feeds, speeds and sizes, write for Bulletin CVTL-4-1 today.
THE BULLARD COMPANY, Bridgeport 2, Connecticut.

BULLARD

BULLARD CREATES *NEW METHODS* TO MAKE MACHINES DO MORE

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Top administrative officials of General Motors hie to Murray Bay resort for first big corporation-wide conference since before the war. Armstrong named Chevrolet chief

DETROIT

WHEN the 500 or so top administrative officials from the far-flung industrial empire of General Motors Corp. gather at Manor Richelieu, Murray Bay, Quebec, next week it will mark the first time such an executives' conference has been held since before the war. In earlier years these annual affairs were held at White Sulphur Springs. They are now being resumed at the plush Canadian spot. The week will be filled with both business and recreation, formal addresses being scheduled by several high executives. Opportunity is provided for the GM administrative family to get better acquainted, to do a little introspective thinking and talking and to give detailed consideration to the many problems incident to running one of the world's largest business organizations.

Naturally the discussions are entirely private. There will be many new faces present and many who have moved to new posts since the last conference. Selection of those to attend the meeting is reportedly in the hands of the general managers of the various divisions. Luncheon table conversation around Detroit is to the effect that the $12,000 annual salary figure is the dividing line between those who do and those who don't attend.

Chevrolet Names Armstrong

INTEREST attaches to the selection of a new general manager of the Chevrolet Division, to succeed the late Nicholas Dreystadt, who died Sept. 3 after a lengthy illness. The choice was W. F. Armstrong, vice president in charge of the manufacturing and real estate staffs. He started with GM in Anderson, Ind., in 1912, became production manager of Olds in 1925, assistant to C. E. Wilson in 1930, assistant general manager of Frigidaire in 1932, then left to join Kelvinator in 1937. He returned to GM in 1943 as special assistant to the executive vice president and a year later headed the manufacturing staff, being elected a vice president at that time.

Dreystadt's passing was not entirely unexpected. Among those who had worked with him at Cadillac and Chevrolet, the consensus was that he had literally worked himself to death. An immigrant from Germany, he became a mechanic for the Chicago Cadillac branch 32 years ago and quickly proved himself a mechanical genius, rising rapidly to the top run of the Cadillac Division in 1934. He was transferred to general manager of Chevrolet when M. E. Coyle moved up to executive vice president. His career was more powerful testimony to the opportunities which America offers to those who have something on the ball, whether they were born here or not. Unfortunately his constant driving for finding better ways of "making things" left him little time for relaxation and his death came at the comparatively early age of 59.

General managership of the Chevrolet Division is one of the most important jobs in GM, since this unit accounts for well over 50 per cent of GM's automotive output. Both H. H. Curtice of Buick and H. J. Klinger of Pontiac were understood to have been approached for the job, but preferred to stay with their respective divisions.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1948	1947
January	422,336†	366,205
February	399,471†	393,663
March	519,154†	443,588
April	462,323†	445,137
May	359,996†	404,191
June	454,401†	421,466
July	489,736	399,456
August	477,671*	364,478
September		444,591
October		461,536
November		417,493
December		492,109
12 mos.		5,055,284

* Preliminary.

† Revised by Automobile Manufacturers Association.

Estimates for week ended:

Aug. 21	113,324	84,726
Aug. 28	100,699	88,098
Sept. 4	100,573	83,444
Sept. 11	85,000	106,095

Estimates by Ward's Automotive Reports

New Engine To Be Shown

OLDSMOBILE Division of GM will show its pilot production line for the Kettering engine to the press this week. Corporation executives and C. F. Kettering will be present for the demonstration of the equipment and the engine itself which will be a feature of one series of Olds models for 1949. Some delays have been experienced in getting the engine into manufacture, the foundry strike at Muskegon, for example, having held up supply of the special cast camshafts required. This tieup now is over and shipments of castings resumed after about a ten-day period for restoring operations to their normal pattern.

Unveil Air-Cooled Units

A SECOND engine preview was held last Friday by Continental Motors Corp. in Detroit, covering a line of seven air-cooled engines which have been under development for the Ordnance Department since 1943. The power plants are for use in all front-line military vehicles and, unlike the conventional liquid-cooled engines used heretofore, are suitable for operation in extremes of temperature. Lightness and small size of the engines in relation to their power were striking, one 250-horsepower model, for example, weighing less than one-third as much as a liquid-cooled unit of corresponding power and occupying little more space than that normally required by the fan and radiator of the liquid-cooled counterpart. Installations of the engines in military vehicles were inspected, as well as Continental's experimental department where the units were in various stages of assembly.

Special Bracing Required

HUDSON'S new convertible model mentioned in these pages last week required special engineering attention in respect to the provision of added bracing of the integral-type frame structure. This is a problem common

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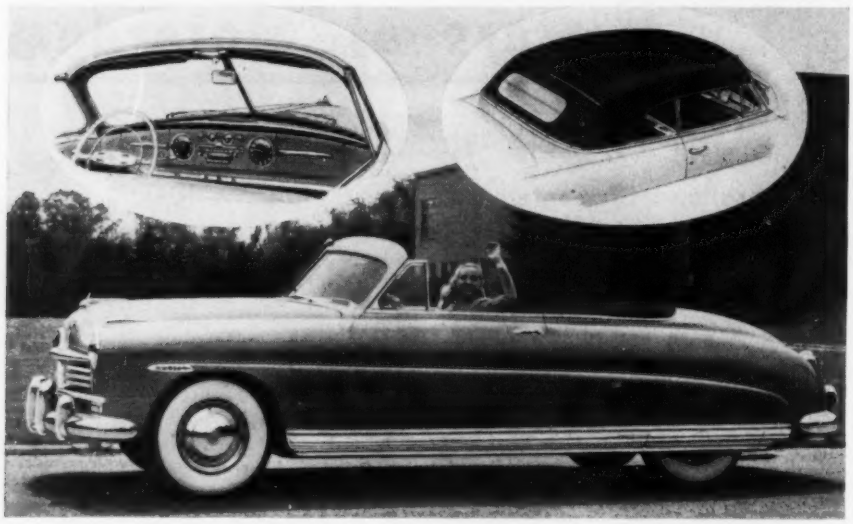

Tooling cost on this new Hudson convertible ran into seven figures and was nearly as much as the company would spend on retooling its entire line prior to the war. Substantial additional bracing of the integral-type frame was required to insure rigidity. Framing system for the folding top, actuated through electro-hydraulic means, contains a number of zinc die castings instead of steel stampings formerly used

to all convertibles which do not have the transverse strengthening effect of a steel top to hold the body rigid. Hudson engineers added a longitudinal steel Z-member inside the box-section siderails. Welded to the latter and braced transversely at intervals, it extends from the line of the dash back about to the rear wheel housing. Also, a flanged 8-inch U-section has been welded to the frame on either side, extending from the door pillar to the wheel housing. The door lock pillar is anchored to the frame and one of the cross members by a heavy malleable iron casting, a construction peculiar to the convertible. An additional support rail, extending from door to door at the belt line has been added, being supported by a vertical ribbed steel bulkhead which is welded to the rail, floor and wheel housing.

Tooling costs for the convertible model alone ran into seven figures, or close to what the company has spent in past years for retooling its complete line. A feature of the electro-hydraulically operated top is the absence of any wood construction and the use of zinc die castings for brackets and other members conventionally made of stamped steel. Top bows are about twice the width of those ordinarily found on convertibles and provide extra lateral rigidity. Further strengthening results from the use of a wide windshield header strip.

Just too late to be included in the compilation of automobile prices published here last week was a $75-$95 advance in the Hudson line. Referring to the table, the latest increase moves the two Hudson models listed to $2482 and $2391, respectively, percentage increases of 139 and 140 over 1941.

Ford Develops New Disk

A RIGID-FRAME lift-type, tandem disk harrow designed to operate with the hydraulic control of the Ford tractor has been developed by the Dearborn Motors Corp. Conventional disks, used by farmers for many years have been built with independent, flexible gangs with adjustable angle, changing the angle regulating penetration and working depth. In the latest design, flexibility of the gangs is eliminated by attaching them rigidly to a steel frame. Disk gangs are permanently set at the most effective working angle, 20 degrees, thus saving the field time ordinarily required to adjust disks for varying soil and terrain.

The change is made possible because penetration and working depth of the harrow are regulated by the hydraulic control of the tractor. Raising and depth setting are accomplished hydraulically, all disks cutting to the same depth and, because of positive alignment between front and rear gangs, the rear disks cut centers without the use of special levers, springs or snubbers. If shallow disking is desired all that is necessary is to keep the implement at the desired depth by means of the hydraulic control. To move the harrow, all that is necessary is to raise it by hydraulic control power and drive the tractor away with it. Production is under way on four models, with either 16 or 18-inch disk blades.

Jeep Output Resumed

WILLYS-OVERLAND last week resumed production of Jeep station wagons and station sedans after a two-month shutdown to effect changeover to a new body builder—Briggs in Detroit. Output was stopped in June while body dies, jigs and fixtures were transferred from Hayes Mfg. Co. in Grand Rapids to Briggs, the switch being made to utilize the larger body-building capacity of the latter company and incidentally probably saving somewhat on freight costs. List price of the station wagon has been raised 6 per cent because of rising cost factors.

Steel Shortage Forces Shutdown

SHEET steel shortages forced General Motors to close down all operations except a few fabricating plants the day before and the day after Labor Day week-end, resulting in a loss of approximately 14,000 vehicles and two days' work for 75,000. With production geared so closely to steel intake, the probability is for further brief suspensions of this character over the coming months until 1949 models are started. Cadillac and Olds are slated to be the first, some parts releases calling for shipment the latter part of this month to body-building departments, suggesting initial assemblies next month. Buick will be coming along at about the same time, while Pontiac and Chevrolet will defer a start until later.

Meanwhile, following record output of trucks in July the GM truck and coach division continued to step up its pace in August to a new all-time peak. Total of 9394 truck units was built, topping July by 641.

Australian Car To Make Debut

AUSTRALIA'S first home-built automobile will be called the Holden, according to the Australian News & Information Bureau, New York. The car will soon be mass-produced by a new company, General Motors-Holdens Ltd. This firm was formed by a GM foreign subsidiary and Australia's largest body builder.

The Holden appears to be a compromise between British and American designs. It has a six-cylinder engine of about 60 hp, American rating, and is expected to sell for about $1920.

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Fansteel Acquires Division

Acquires all stock in Vascoloy-Ramet Corp., maker of carbide cutting tools, etc.

ENTIRE common stock equity in Vascoloy-Ramet Corp. held by Vanadium-Alloys Steel Co. has been acquired by Fansteel Metallurgical Corp., North Chicago, Ill.

Vascoloy-Ramet Corp. was established in 1933 to manufacture and distribute tantalum-tungsten carbide cutting tools, dies and wear-resisting parts. Fansteel had owned two-thirds of Vascoloy-Ramet previously and bought complete control by acquiring Vanadium-Alloys' one-third interest. Fansteel supplies Vascoloy-Ramet with its rare metal materials.

Plant in Waukegan — The plant of the new subsidiary in Waukegan, Ill., contains 80,000 sq ft of floor area and has complete equipment for production of refractory metal carbide products. As of Dec. 31, 1947, the company possessed current and fixed assets at a gross value of $1,576,291.

Vascoloy-Ramet will continue to operate under its own name as a division of Fansteel. An expansion and integration program will soon be under way.

STEEL MILL VILLAGE: Next door to the world's largest steel plant, these 38 housing units soon will be occupied by newly recruited, unmarried male employees of the Gary, Ind., works of Carnegie-Illinois Steel Corp. Unable to obtain adequate housing for new employees, this U. S. Steel Corp. subsidiary let a $292,000 contract for these dormitory units, each containing six bedrooms, shower and bath facilities and lounge

Permanente Leases Ohio Plant

PERMANENTE Metals Corp., Oakland, Calif., a Kaiser interest, has been awarded lease of an aluminum mill at Newark, O., by War Assets Administration.

The plant, including 36 buildings on 300 acres of ground, was operated during the war by Aluminum Co. of America. The lease is for 10 years with the privilege of renewing an additional 15 years. Rental is based on 5 per cent of net sales.

Unit was built for production of 10 million pounds of aluminum blooms and 15 million pounds of rod a month. It has a casting capacity of 40 million pounds a month, which is in excess of rolling capacity.

Permanente plans to use the plant to produce smaller size rods and bars and will install a wire and cable mill which, with other facilities, will cost about $3,500,000.

Crucible Acquires Trent Tube

TRENT Tube Mfg. Co., East Troy, Wis., maker of tubes, tubing and special machinery, has become a wholly owned subsidiary of Crucible Steel Co. of America.

Trent will retain its corporate identity and will continue under the present management, headed by Walter H. Wiewel, president and general manager. Stockholders of Trent accepted 45,000 shares of Crucible common stock in exchange for all of the Trent outstanding stock.

Two Bid for Chicago Brass Unit

TWO bids have been submitted to WAA, Chicago, for purchase of the brass casting and rolling plant at 6630 Fullerton Ave., Chicago, which was operated during the war by Revere Copper & Brass Inc.

An offer of $3,700,000 was made by Cowles Industries Inc., 612 N. Michigan Ave., Chicago, which wishes to acquire the plant for use as a brass and copper rolling mill. John D. Pollack, engineer, 33 S. Clark St., Chicago, offered $3,250,000 for the plant for use in production of various steel products.

The facility was built at a cost of $11,575,185 and current fair value had been set at $4,191,000. The two bids were taken under advisement.

Cladmetals To Open Department

NEW finishing department facilities being installed at American Cladmetals Co.'s Carnegie, Pa., plant will be started Sept. 15, according to Robert W. Russell, executive in charge of the construction program.

Operations in the new department will include inspection, levelling, pattern sheet shearing, packaging and shipping facilities. The plant's new rolling mill installation with its electric motor and heavy drive are already installed. The company expects to have its rolling mill ready during the fall. The power station is being completed by the Duquesne Light Co. and the heating furnace fired by natural gas, which is auxiliary to the rolling mill, is being made ready. Firm's cladding department at Wilmington, Del., was started this spring.

At present, American Cladmetals is concentrating on production of Rosslyn metal, a cladmetal which has copper sandwiched between layers of stainless steel.

Construction Sets Record

NEW construction in August established an all-time monthly record at $1785 million, 31 per cent above a year ago.

For the first eight months, new building cost $11.2 billion, 35 per cent higher than the comparable period of 1947.

The increase in physical volume is considerably less than indicated by the dollar figures, representing joint estimates by the departments of Commerce and Labor.

Of the total construction to date this year, $8779 million represents private work, and $2445 million public work.

Briefs . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Brown Instrument Division, Philadelphia, Minneapolis-Honeywell Regulator Co., has expanded the personnel of its engineering development department by 30 per cent and that of its other engineering departments by 10 per cent. Hirings supplement physical expansion of the company now going forward in a $2,500,000 construction program.

—o—

Atomic Energy Commission announces that administration of the research service contract between Battelle Memorial Institute, Columbus, O., and the commission has been assumed, Sept. 1, by the Office of Chicago Directed Operations. Contract which involves research and services in the fields of metallurgy had previously been administered by the Oak Ridge Directed Operations office.

—o—

F. L. Jacobs Co., Detroit, is negotiating with Crosley Division of Avco Mfg. Corp. for the manufacture by Jacobs of an automatic washing machine to be distributed by Crosley as an addition to its line.

—o—

Swift & Co., Chicago, will begin operations this fall in a new plant at Hammond, Ind., for production of glycerides and fatty acids for use in the manufacture of industrial oils.

—o—

Larkin Lectro Products Corp., New York, manufacturer of arc and spot welding machines, has appointed Royal Crest Corp., New York and Chicago, as a representative in New York state and Illinois.

—o—

City Auto Stamping Co., Toledo, O., producer of metal stampings, has completed a $1,600,000 expansion program started about a year ago. Included in the program was the purchase of four large presses.

—o—

Detrex Corp., Detroit, manufacturer of cleaning equipment and chemicals, is expanding its sales area and will offer its products to the automotive and aviation service field.

—o—

B. F. Goodrich Co., Akron, will begin construction at once on a building at Tuscaloosa, Ala., for production of rubber lining for storage tanks, tank cars, pipe lines and other equipment.

—o—

Ryan Aeronautical Co., San Diego, Calif., has received a contract from the Air Force and Navy for the development and manufacture of a service test quantity of jet-powered, high-speed, pilotless aircraft, to be used as target planes.

—o—

Westinghouse Electric Corp., Pittsburgh, has begun production of an all-weather, general purpose turbine for driving industrial pumps, fans, blowers and other devices. The turbine is called the Typee.

—o—

Ohio Fuel Gas Co. has begun operation of a new compressor station at Perrysville, O. Unit was constructed by Chemical Plants Division of Blaw-Knox Co.

—o—

Radio Manufacturers Association reports that its members turned out 56,089 television receivers in July. This was an average of 14,022 sets a week, an increase of 30 per cent over the average weekly production in the first six months of this year. Radio receiver output dropped to 627,349 in July, the lowest monthly output since February, 1946.

—o—

Food Machinery Corp., San Jose, Calif., and Westvaco Chemical Corp., New York, have formally merged and Food Machinery, as the surviving company, has changed its name to Food Machinery & Chemical Corp.

—o—

United States Rubber Co., New York, reports it has completed postwar expansion and modernization costing more than $80 million. Firm now has highest productive capacity in its history.

—o—

SKF Industries Inc., Philadelphia, announces its Shippensburg, Pa., plant, activated one year ago, has achieved a normal rate of production of pressed and machined retainers for ball and roller bearings. The 170 employees in the factory have been receiving on-the-job training.

—o—

Hyster Co., Portland, Oreg., manufacturer of industrial trucks and tractor equipment, has named Shipping Utilities, St. Louis, as its distributor in 36 counties of Missouri and 50 counties of Illinois.

—o—

Reynolds Metals Co., Richmond, Va., will take over operation of the limestone quarry of Batesville White Lime Co. at Batesville, Ark., next month under a 15-month contract. A maximum of 500,000 tons of chemical limestone will be furnished annually for Reynolds' Hurricane Creek alumina plant near Bauxite, Ark.

—o—

Eagle-Picher Mining & Smelting Co., Miami, Okla., has purchased an ore smelting plant at Henryetta, Okla., from War Assets Administration for $80,000. Eagle-Picher has been operating the plant on a lease arrangement since 1942.

—o—

Harmor Development Co., newly formed and headed by Rockford, Ill., men in the sewing machine industry, has purchased National Sewing Machine Co., Belvidere, Ill., for $5 million.

—o—

Mall Tool Co., Chicago, has purchased a warehouse in Birmingham at 2516 Sixth Ave. S. and will distribute its products to several southern states from this facility.

—o—

Mill Basin Ship Repair Co. Inc., Brooklyn, N. Y., has completed a 50-foot, all-steel, twin diesel tug destined for use by Moore-McCormack lines in Belem, Brazil on the Amazon river.

—o—

Boeing Airplane Co., Seattle, was recently host to guided missile authorities from all over the United States at a four-day symposium.

—o—

Avondale Marine Ways Inc., Westwego, La., has received a $400,000 contract from Creole Petroleum Corp., subsidiary of Standard Oil Co. of New Jersey, for construction of twenty 45-foot dispatch service launches. Vessels will be used in Venezuela.

—o—

Defiance Machine Works Inc., Defiance, O., manufacturer of boring mills, production drills and special production machinery, reports that its New York sales agent, Vandyke Churchill Co., will also represent Defiance in the added areas served by the sales organization's Philadelphia and New Haven, Conn., offices.

—o—

F. H. McGraw & Co., New York, reports that the Nelson L. Davis Co., which designs and supplies coal processing equipment for McGraw, recently demonstrated a new coal cleaning process that will separate metallurgical coal from steam coal at a test plant in Chicago.

—o—

General Electric Co. recently held its annual conference at Schenectady, N. Y., and Pittsfield, Mass., for professors of chemistry and chemical engineering.

The Business Trend

INDUSTRIAL activity in the week ended Sept. 4 displayed firmness although it remained slightly below its record peaks of August. Thus for a second consecutive week STEEL's industrial production index registered 169 per cent (preliminary) of the 1936-1939 average.

Steel ingot output edged off one point, but remained at 95 per cent of capacity. Bituminous coal production for the week ended Aug. 28 also fell off slightly from the preceding week's level to 12,230,000 net tons, but was 215,000 tons higher than for the corresponding week last year.

PETROLEUM—Industrial users who fear a fuel oil shortage this winter may find encouragement in the recent report of the Economic Advisory Committee of the Interstate Oil Compact Commission stating that the oil industry should be able to take in stride the expected 7 per cent increase in demand for oil fuels. Refinery production for the year to date is running ahead of the amount estimated as necessary to meet the nation's need, and barring unforeseen developments there should be sufficient fuel and gasoline available this winter to preclude curtailment of industrial operations. Crude oil production figures for the four weeks ended Aug. 28 averaged in excess of 5.5 million bbl daily.

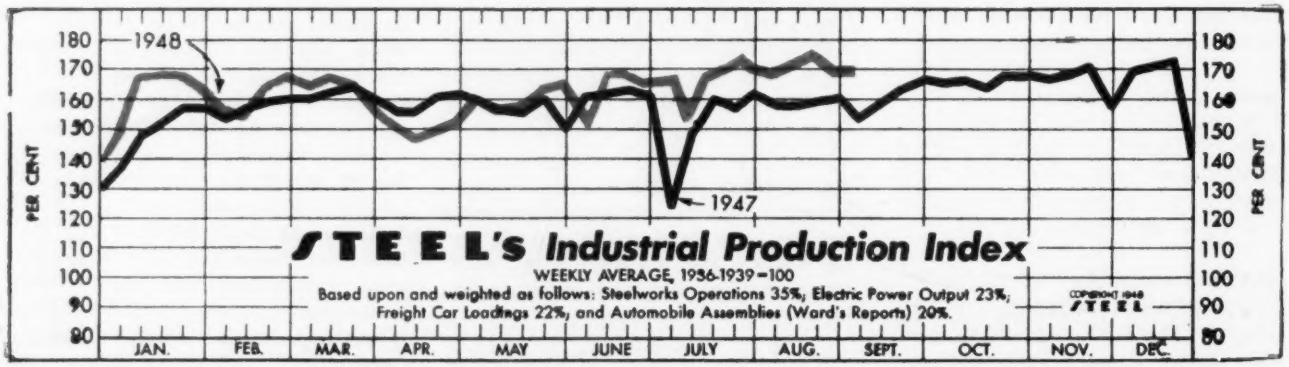
AUTOMOBILES—Although the principal suppliers' strikes that have hampered automobile production for the last two months have been settled, production for the week ended Sept. 4 dropped to the lowest figure since July 10, with 100,573 car and truck assemblies being produced in the United States and Canada. It will be some time until the flow of component parts from the foundries which have resumed production is large enough for normal operations throughout the industry.

FREIGHT CARS—Deliveries of railroad freight cars in August topped the 10,000 mark for the second month this year. Of the month's total of 10,362 cars, 7450 were produced by car builders and 2912 by railroad shops.

CONSTRUCTION—Civil engineering construction volume in the continental United States totaled slightly in excess of $560 million during August. The average of $140 million for each of the four weeks of the month is 2 per cent below the average for July, 1948, but 36 per cent above the weekly average for August, 1947.

BUSINESS—New business incorporations during July declined to the lowest level since November, 1945, according to Dun & Bradstreet Inc. The July total of 7690 new businesses chartered represents a drop of 10.1 per cent from 8550 in June and a loss of 14.9 per cent as compared with 9041 in July, 1947.

PRICES—Average wholesale prices for the week ended Aug. 28 declined 0.5 per cent after equaling the postwar high the preceding week, according to the Bureau of Labor Statistics. Prices of raw materials and manufactured products also declined 1.1 and 0.7 percentage points, respectively.



Index (chart above): Week ended Sept. 4 (preliminary) 169 Previous Week 169 Month Ago 168 Year Ago 153

BAROMETERS of BUSINESS

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	95.0	96.0	94.0	93.0
Electric Power Distributed (million kilowatt hours)	5,400‡	5,478	5,319	4,721
Bituminous Coal Production (daily av.—1000 tons)	2,038	2,052	2,068	2,003
Petroleum Production (daily av.—1000 bbl.)	5,535‡	5,529	5,505	5,173
Construction Volume (ENR—Unit $1,000,000)	$146.8	$95.2	$153.6	$122.8
Automobile and Truck Output (Ward's—number units)	100,573	100,699	108,864	83,444

* Dates on request. † 1948 weekly capacity is 1,802,476 net tons. 1947 weekly capacity was 1,749,928 net tons. ‡ Preliminary.

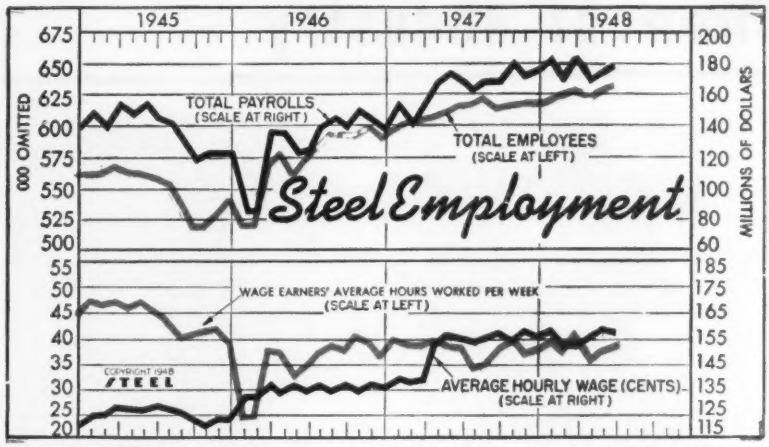
TRADE				
Freight Carloadings (unit—1000 cars)	870†	891	879	809
Business Failures (Dun & Bradstreet, number)	94	96	116	60
Money in Circulation (in millions of dollars)‡	$28,072	$27,965	$27,922	$28,749
Department Store Sales (changes from like wk. a yr. ago)‡	−8%	+12%	+7%	+7%

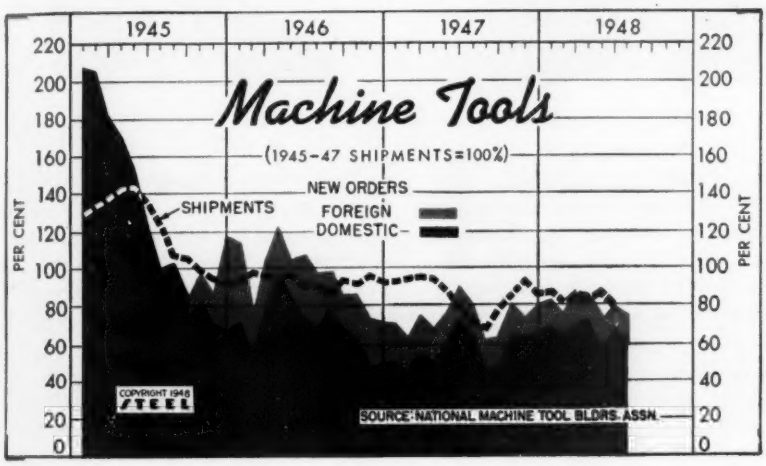
† Preliminary. ‡ Federal Reserve Board.

Steel Employment

	Employees† (000)		Total Payrolls (millions)		Hourly Wages† (cents)	
	1948	1947	1948	1947	1948	1947
Jan.	622	601	$180.2	$155.8	157.3	138.1
Feb.	626	607	167.6	139.5	155.1	137.0
Mar.	629	609	183.0	150.6	154.8	137.9
April	626	611	168.5	168.3	155.1	153.3
May	628	615	175.3	175.8	157.7	155.6
June	634	623	179.5	167.6	156.9	154.7
July	...	623	....	163.2	....	153.9
Aug.	...	625	....	169.1	....	155.6
Sept.	...	618	....	168.9	....	157.1
Oct.	...	620	....	180.1	....	154.6
Nov.	...	624	....	171.0	....	158.7
Dec.	...	621	....	175.3	....	156.5

† Monthly average.





Machine Tools

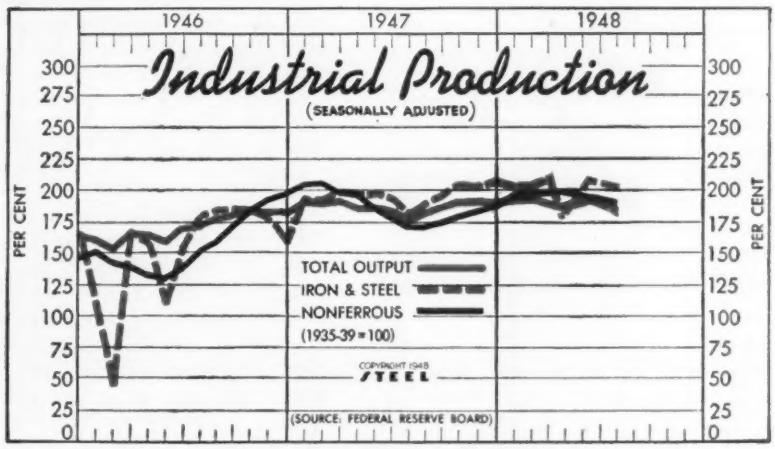
(1945-47 Shipments=100)

	Orders—Total		Orders—Domestic		Shipments (3 Mos. Ave. Centered)	
	1948	1947	1948	1947	1948	1947
Jan.	83.1	71.7	69.1	50.7	86.9	93.1
Feb.	77.3	63.8	64.6	48.0	81.9	94.8
Mar.	86.3	74.3	70.2	54.2	84.2	95.4
Apr.	86.3	69.8	72.2	51.0	82.7	94.3
May	73.5	76.9	62.1	60.6	86.3	88.9
June	83.4	90.9	71.5	73.7	79.9	79.5
July	74.5	81.1	61.1	64.4	...	71.0
Aug.	...	62.1	...	47.5	...	68.6
Sept.	...	63.7	...	49.0	...	78.5
Oct.	...	81.0	...	65.0	...	85.5
Nov.	...	75.6	...	64.1	...	92.6
Dec.	...	81.1	...	66.3	...	86.1

Federal Reserve Board's Production Indexes

(1935-39=100)

	Total Production		Iron, Steel		Nonferrous	
	1948	1947	1948	1947	1948	1947
Jan.	193	189	203	192	197	203
Feb.	194	189	203	191	197	208
Mar.	192	190	207	196	200	202
Apr.	188	187	177	195	198	197
May	191	185	206	197	197	187
June	192	184	207	193	193	179
July	187	176	201	181	190	171
Aug.	...	182	...	188	...	171
Sept.	...	186	...	195	...	174
Oct.	...	190	...	204	...	179
Nov.	...	192	...	202	...	185
Dec.	...	192	...	205	...	189
Ave.	...	187	...	195	...	186



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$12,353	$12,214	$13,278	$10,175
Federal Gross Debt (billions)	$253.1	$253.2	$253.4	$260.0
Bond Volume, NYSE (millions)	$14.0	$11.5	$14.4	$13.3
Stocks Sales, NYSE (thousands)	3,776	2,850	3,863	2,892
Loans and Investments (billions)†	$63.2	$63.4	$63.1	$63.7
United States Gov't. Obligations Held (millions)†	$34,702	$34,904	$34,870	$38,395

† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$93.86	$93.86	$93.55	$75.41
All Commodities†	168.2	169.2	168.3	154.0
Industrial Raw Materials†	181.7	182.8	183.4	167.9
Manufactured Products†	164.2	164.9	163.5	148.9

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry

M. A. FOLLANSBEE

GILBERT B. RICHARDS

OTTO G. SCHWENK

M. A. Follansbee has been elected executive vice president of Follansbee Steel Corp., Pittsburgh. Mr. Follansbee started with the corporation in the Operating Division in 1913, and has been with the company since that time except for a period of service during the first world war. He was elected a director of the corporation in 1940 and in 1941 was elected vice president in charge of sales, a position he will continue to hold in addition to his new responsibilities as executive vice president.

—o—

Charles O. Rader, formerly commercial sales promotion manager, Koppers Co. Inc., has been named sales manager, Aer-a-sol Products, Bridgeport Brass Co., Bridgeport, Conn. Mr. Rader will be responsible for initiating a new program of marketing products in the Aer-a-sol Division.

—o—

Election of a new director and two new vice presidents has been announced by Globe Steel Tubes Co., Milwaukee. **George W. Walzer,** vice president in charge of manufacturing, was elected a director to fill the vacancy caused by the recent death of **F. J. O'Brien,** who was vice president in charge of sales. **Dr. Harry K. Ihrig** was elected vice president and director of laboratories, and **Lee Mullen** was elected vice president in charge of sales.

—o—

Thomas G. Harvey has been appointed metallurgical engineer, Foundry Division, Sonith Industries, Indianapolis. Mr. Harvey was formerly chief metallurgist, Monarch Steel Co.

—o—

Wendell C. Davis has been elected president and **Harold E. Jalass,** vice president, Cribben & Sexton Co., Chicago. Mr. Davis, formerly vice president, succeeds **William M. Hillbron,** who resigned. Mr. Jalass will combine his new duties with his present position as sales manager.

—o—

Gilbert B. Richards has been appointed general sales manager of Firth Sterling Steel & Carbide Corp., McKeesport, Pa., and will co-ordinate the sales of Steel, Carbide and Toolmaking Divisions of the company. Mr. Richards was formerly general sales manager of Bostitch Inc., East Greenwich, R. I., and previously commercial sales manager for Firestone Tire & Rubber Co.

—o—

G. Luke Mizell has been named to the board of regional sales supervisors, Eutectic Welding Alloys Corp., New York. Mr. Mizell was a senior field engineer for Eutectic, and on his new post will be responsible for field engineers in the Middle and South Atlantic area of the United States.

—o—

Andrew W. DeShong has been appointed assistant to the general manager, Chance Vought Aircraft Division, United Aircraft Corp., East Hartford, Conn. Mr. DeShong has been director of industrial service, Republic National Bank, Dallas, Tex., and during the war was employed by North American Aviation as public relations director and later as assistant to the division manager.

—o—

James I. Minteer has been appointed secretary of Stewart-Warner Corp., Chicago, filling the vacancy created by the death of **A. R. Benson** on July 31. Mr. Minteer joined Stewart-Warner in 1942 as fiscal agent of the Green River Ordnance plant which was operated by the corporation during the war. He had been assistant secretary and assistant treasurer since 1943.

—o—

Yale & Towne Mfg. Co., New York, has appointed **Otto G. Schwenk** vice president in charge of production. Until his present appointment, Mr. Schwenk served as assistant to the president of Weatherhead Co., Cleveland, after gaining manufacturing experience as a foreman, industrial engineer, general production manager and assistant to the president in several eastern and middle western firms.

—o—

As of Sept. 1, **L. A. Adams** became assistant to the vice president, and **A. S. Ault** became manager, sales and service, for Chicago Vitreous Enamel Product Co., Cicero, Ill. Mr. Adams joined the firm in 1929 as eastern district manager and in 1947 became assistant manager, sales and service, with headquarters in Chicago. Mr. Ault associated with the company in 1936, also as eastern district manager, and served in various posts with the company until promotion to assistant manager, sales and service, at the close of the war.

—o—

Jack A. Mansfield, sales representative for the past 11 years for Diamond Alkali Co., Cleveland, has resigned to become a partner in a new concern to be known as Man-Gill Chemical Co., Cleveland. His partner in the new firm is **Vincent Gilliam,** who heads Gilliam Inc., Cleveland.

—o—

John C. Murray has been named as-

Everlasting Fastenings

Resistance to Rust and Corrosion	Attractive Appearance
Resistance to High Temperatures	Easy to Clean
Non-Magnetic	High Strength
Non-Sparking	Long Service
Re-Usable	Lower Ultimate Cost
Resistance to Fatigue	**Common Steel—Low First Cost**

PROMPT SHIPMENT FROM STOCK. **Bolts, Nuts, Screws, Washers, Rivets and Accessory Items in Brass, Bronzes, Copper, Monel, Stainless.** Harper maintains stocks of over 5,000 different items in Chicago and New York . . . large quantities of each. Others being added constantly. Specials made to order from ample stocks of raw materials. Write for catalog.

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sistant to the Youngstown district manager, Republic Steel Corp., Cleveland. Mr. Murray joined Jones & Laughlin Steel Corp. in 1915, in 1929 was named junior assistant general superintendent of the Pittsburgh works and in 1935 became senior assistant.

—o—

Dr. Lewis W. Chubb, who served as director of research laboratories, Westinghouse Electric Corp., Pittsburgh, from 1930 until assuming the honorary post of director emeritus last March, has retired after 43 years of scientific research with the corporation. Last year Dr. Chubb was awarded the John Fritz Medal, highest tribute to scientists and engineers.

—o—

Frank E. Scheliga has been appointed superintendent of the rolling mill, Torrance, Calif., plant of Columbia Steel Co.

—o—

R. F. Dierking has been appointed manager, West Central offices, Portland Cement Association, Chicago, succeeding **R. W. Winters,** resigned. Mr. Dierking's headquarters will be in Kansas City, Mo., and in his new position he will direct association field work in Colorado, Kansas, Missouri, Nebraska, Oklahoma and Wyoming.

—o—

Donovan H. Tyson has been appointed controller and member of the finance committee, Sylvania Electric Products Inc., New York. Mr. Tyson, who has been a consultant for financial and general management since 1946, served four years in the Office of the Fiscal Director of the War Department, attaining the rank of colonel. From 1929 until 1942 he was controller and secretary of the U. S. Pipe & Foundry Co.

—o—

Henry V. Bootes, formerly district sales manager, New York district, has been appointed assistant vice president of American Car & Foundry Co., New York. He will continue to make his headquarters in New York. Prior to joining the company in 1947 Mr. Bootes had been district manager of Ohio Injector Co., Wadsworth, O., manufacturer of railroad equipment.

—o—

The following personnel changes have been announced by Power Plus Products Co., Detroit: **Dean W. Johnston,** formerly sales manager, Hydraulic Division, New York Air Brake Co., has been appointed manager of sales and distribution; **Elwyn Kaake,** formerly on the engineering and production staff, Hydraulic Machinery Inc., Dearborn, Mich., has been appointed chief engineer in charge of engineering and production; **Charles Billadeau** is in charge of production of the Electrical Division, **Thomas Jones,** the Armature Wedge Division, and **Philipp Brod,** the Plating Division. Mr. Billadeau and Mr. Jones advanced to their present positions through many years of experience with Motor City Electric Co., formerly operated as a fully owned subsidiary of Power Plus Products Co. Mr. Brod for 12 years was superintendent of plating for Detroit Lubricator Corp.

—o—

H. D. Solomon, who has served in various executive capacities with Fisher Body Division, General Motors Corp., has been named assistant to general manufacturing manager, Lincoln-Mercury Division, Ford Motor Co., Detroit. In addition to the number of positions Mr. Solomon held with Fisher Body, he was transferred to the central engineering staff of General Motors in 1941 and worked on aircraft production during the war. **G. S. Borgquist,** until recently assistant manager of Fisher Body's Fleetwood plant, has been appointed Lincoln plant manager in charge of production. Mr. Borgquist joined Briggs Mfg. Co. in 1926 and held numerous positions with the firm until 1936 when he went to Fisher Body in its Fleetwood plant. In 1941 he was named assistant plant manager.

—o—

Claude O. Rainey has been elected secretary-treasurer, Morrison Steel Products Inc., Buffalo. Mr. Rainey, who formerly was controller of the Production Division, Trico Products Corp., succeeds **Martin C. Ewald,** who retired because of ill health.

—o—

Sherrill S. Deputy, assistant sales manager, American Wheelabrator & Equipment Corp., Mishawaka, Ind., since 1946, has recently been appointed sales manager of the company. Prior to his association with this corporation, Mr. Deputy spent 18 years with International Business Machines Inc. in various sales and administrative positions.

—o—

Inland Steel Products Co., Milwaukee, announces opening of a branch office and warehouse at St. Louis, with **John E. Meroney,** the company's sales representative in this area for several years, appointed district sales manager in charge of the St. Louis Division.

—o—

Phoenix - Apollo Steel Co., Phoenixville, Pa., announces election of **F. S. Gibson Jr.** as chairman of the board, and election of **David Thompson** as president. Mr. Thompson formerly held the position of general manager.

—o—

Robert U. Haslanger has been appointed assistant to the general manager of the Western Division for Monsanto Chemical Co., St. Louis.

—o—

I. N. Merritt has resigned as vice president and general manager of

DONOVAN H. TYSON

H. D. SOLOMON

G. S. BORGQUIST

Follow the ~~blue~~ pink print for lower metal cutting costs

You'll see an important scaling down of metal cutting costs when you switch to Cimcool. It's a revolutionary new cutting fluid—a *chemical emulsion*—that cuts costs in three major ways:

1. Cimcool prolongs tool life (and that means less down time) because of its *chemical lubricity.*
2. Faster speeds are possible because Cimcool cools faster, through a unique physical change in the cutting fluid itself. Tools and chips actually stay cool to the touch.
3. Cimcool costs less than old-fashioned cutting fluids because it lasts longer. It isn't subject to rancidity. Its low surface tension and low adhesion to work and chips virtually eliminates carry off.

CIMCOOL DIVISION OF THE CINCINNATI MILLING MACHINE CO., CINCINNATI 9, OHIO, U. S. A.

CIMCOOL for 85%

Trade Mark Reg. U. S. Pat. Off.

OF ALL METAL CUTTING JOBS

the Conlon Division, Conlon-Moore Corp., Chicago. Arrangements are under way, contemplating the selling of Conlon household washers and ironers in a number of middle western states by a sales organization to be headed by Mr. Merritt.

—o—

Otto J. Hartwick has been appointed technical director, Houston Paint Division, Pittsburgh Plate Glass Co., Pittsburgh. Associated with the paint industry since his graduation from New York University in 1921, Mr. Hartwick joined the company's Newark, N. J., Paint Division in 1926.

—o—

Gerald T. Haddock has been appointed American sales representative of Lafarge Aluminous Cement Co. Ltd., London, England. Recently sales promotion manager, Lumnite Division, Universal Atlas Cement Co., New York, he held a similar position with the former Atlas Lumnite Cement Co.

—o—

W. F. Longfield has been appointed sales manager of the Warco Press Division, Federal Machine & Welder Co., Warren, O. Mr. Longfield has been associated with the manufacture, design, sales and application of presses for over 35 years.

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Gordon E. Garnhart has been appointed director, Real Estate & Insurance Division, Westinghouse Electric Corp., Pittsburgh, succeeding **H. L. Hubbell,** resigned to take up other activities.

—o—

Parker F. Wilson has been elected president and director of Kerotest Mfg. Co., Pittsburgh. Former president, **Walter G. Swaney,** has been named vice chairman of the board. Associated with the steel industry for 20 years, Mr. Wilson has served in various executive capacities with Otis Steel Co., Wheeling Steel Corp., and more recently as president of Pittsburgh Steel Foundry Corp.

WALTER J. BLOOM

Named vice president, General Sheet Steel Co., Detroit. Noted in STEEL, Aug. 30 issue, p. 52

R. S. REYNOLDS JR.

Elected president, Reynolds Metals Co., Richmond, Va. Noted in STEEL, Sept. 6 issue, p. 87

—o—

Phosphor Bronze Corp., Philadelphia, announces appointment of **Ralph M. Bixler** as sales manager of mill products. Formerly vice president, Downs-Smith Brass & Copper Co. Inc., New York, Mr. Bixler brings many years of experience to his new assignment. **Howard S. Thrasher** continues as assistant secretary and assistant general sales manager.

—o—

Dr. D. P. Morgan, who recently joined Mathieson Chemical Corp., New York, as administrator of research and development, has been appointed vice president in charge of the development department. He had previously been in charge of chemical market research and development at W. R. Grace & Co., and during the last several years of World War II, served as director of Chemicals Bureau of the War Production Board.

—o—

Henry M. Harrold has been named vice president of operations, Bridgman Castings Inc., Bridgman, Mich., subsidiary of Hannifin Corp. He joined the Bridgman organization as sales manager early this year after having been previously associated with Sperry Gyroscope Co. and Caterpillar Tractor Co.

—o—

Harry L. Spencer has been appointed director of manufacturing of all five Norge Division plants of Borg-Warner Corp., Detroit. He succeeds **J. Nall Candler,** recently named director of manufacturing, who has been promoted to assistant general manager of the Norge Division. Mr. Spencer rejoins Norge after five years with Bendix Home Appliances Inc., where he was vice president in charge of manufacturing.

OBITUARIES . . .

Carl A. Carlson, 60, sales engineer for Norton Co., Worcester, Mass., died Aug. 29 in a plane crash near Winona, Minn. Born in Stockholm, Sweden, he came to the United States in 1912 and began his career with Norton Co. in July, 1913.

—o—

H. M. Nelson, 76, president and treasurer, H. M. Nelson Machine & Iron Works, Newark, N. J., died Sept. 5. He founded the steel plate fabricating plant in 1922.

—o—

Harry H. Barber, 70, a founder and chairman, Barber-Greene Co., Aurora, Ill., died Sept. 6 in that city. He was the inventor of numerous machines, including a snow loading device for cleaning highways and an asphalt laying machine.

—o—

Warren D. Felty, 49, sales engineer for Allis-Chalmers Mfg. Co., Milwaukee, died Sept. 5 after a short illness. He had been with Allis-Chalmers for the last 26 years.

—o—

Milton J. Tudor, 79, vice president, Tudor Boiler Mfg. Co., Cincinnati, died Aug. 27.

—o—

John A. Morrison, 70, president, Cer-Mer Metal Co., Philadelphia, died Aug. 30.

—o—

Louis C. Bonnot, 90, one of the founders and for 30 years president, Bonnot Co., Canton, O., died Aug. 29. He was known for machine developments in rotary kilns, coolers, dryers, pulverizing and extruding equipment.

—o—

Norman Redmer, 45, founder and president, United Precision Products Co., Shabbona, Ill., died Aug. 25. The company moved from Chicago to Shabbona 18 months ago.

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Frank A. Avery, 80, secretary, Buffalo Scale Co., Buffalo, died Aug. 30.

—o—

Ignaz Schwinn, 88, one of the founders and retired chairman, Arnold Schwinn & Co., Chicago, manufacturer of bicycles, died Aug. 31.

—o—

Carl M. Bernegau, 82, chairman of the board of Keuffel & Esser Co., New York, manufacturer of engineering and drafting equipment, died Sept. 5.

Mine Mechanization Seen

Thomas Robins, chairman of Hewitt-Robins, says coal industry must mechanize more

COAL mining industry will need to mechanize completely its operations within the next 10 years in order to hold its present markets, Thomas Robins Sr., inventor of the modern belt conveyor and chairman of Hewitt-Robins Inc., New York, said recently on the occasion of his 80th birthday.

The coal mining industry, in Mr. Robins' opinion faces the challenge of a desperate need for more production in the light of increased costs and growing competition from other fuels. Mr. Robins developed the belt conveyor in 1891 and it is now used for handling raw materials in the various stages of processing.

According to Mr. Robins, from the outset it was hoped the belt conveyor would increase the output of mines and eliminate much backbreaking labor. It is doing that today, he said, as the coal mining industry is conveyorizing operations at a rapid pace. As an example he cited the New Kathleen Mine in DuQuoin, Ill., operated by the Union Colliery Co., St. Louis, which has just been completely conveyorized. Production in this mine has reached 32 tons per man per day, more than three times average production in the American coal mining industry and about 10 times greater than average production in England.

Mr. Robins predicted that the next major industry to be conveyorized will be iron ore. He explained that the declining quality of iron ore in the Mesabi Range was forcing producers to establish beneficiating plants at the site of the mines to improve ore quality, and that this will necessitate a whole new approach to the problem of handling ore.

Dresser Shows Record Earnings

RECORD demand for petroleum and natural gas accounts in part for the high profit shown during the nine months ended July 31 by Dresser Industries Inc., Cleveland, which owns companies manufacturing gas appliances and petroleum processing equipment.

Net sales for the period exceeded the rate of $100 million a year, amounting to $76,944,198 by comparison to $80,095,199 for the previous full fiscal year. Net profit for the nine months of $5,623,586 exceeded the net profit of $4,439,189 for the previous full fiscal year.

This record, according to H. N. Mallon, company president, reflects not only the high petroleum and gas demand, but also Dresser's program of capital investments and management planning. Firm is a management organization which owns a number of manufacturing companies producing related products.

Yoder To Build Two Pipe Mills

YODER Co., Cleveland, has booked orders for two large pipe mills. Both will be used to produce pipe for carrying natural gas and oil.

One mill, a 16-in. unit, goes to Page-Hersey Tubes Ltd., Ontario, Canada. Pipe ranging from 4½ to 16 in. in diameter, with a wall thickness up to ½ in. can be made. The initial contract of $750,000 includes a leveler and side trimmer, shot blast, forming mill, a 1500 KVA welder, sizing mill and some rolls. Delivery is expected by June, 1949. An additional $300,000 worth of auxiliary equipment will be made in Canada under Yoder engineering supervision.

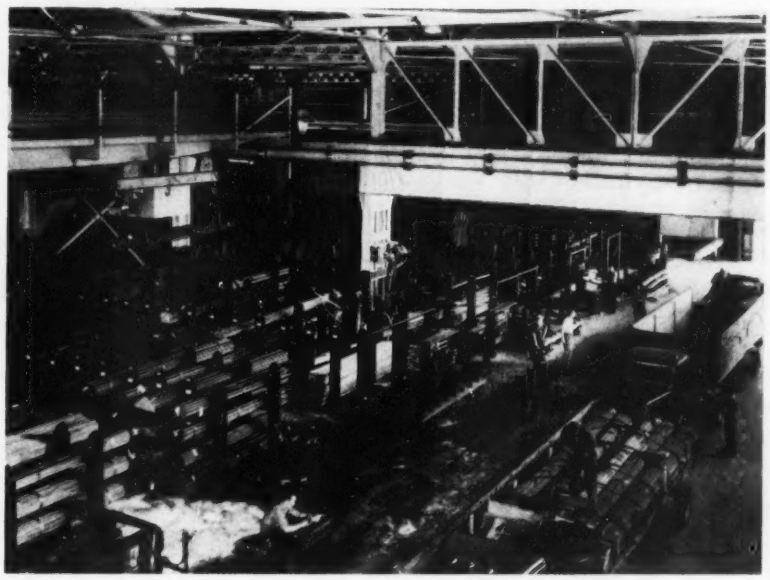
The other facility, a 14-in. mill, goes to Kaiser Steel Co. at Fontana, Calif. This mill will produce pipe ranging from 4½ to 14 in. in diameter with a maximum wall thickness of ⅜ in. Amounting to $660,000, the complete contract calls for about the same equipment as for the Canadian mill, but of somewhat smaller design. Another $400,000 worth of equipment will be added later to go with this mill. Delivery is scheduled for September, 1949.

Forty tons of plate per hour will be required to keep each machine in operation when producing average 10-in. pipe. This is enough to produce about three miles of pipe each eight-hour day.

Device Measures Coating Loss

TECHNICAL experts of the porcelain enamel industry, at the National Bureau of Standards, Washington, recently witnessed the unveiling of a new instrument which they think will work wonders in improving adherence of porcelain enamel coatings. Known as the Porcelain Enamel Institute adherence meter, it is the first device which permits accurate measurement of the loss of coating from a steel surface by impact. It does this by means of a meter head equipped with 169 points which establish electrical contacts with the surface of a sample and reveal how much coating has been lost. The new measuring tool will be fundamental hereafter in seeking new and improved coating mixtures.

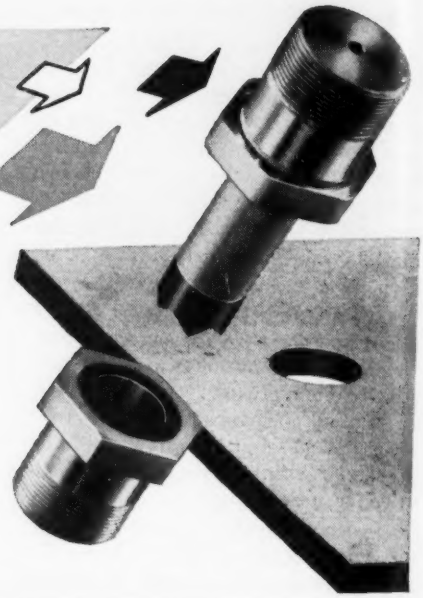
The new adherence meter is the fruit of work that has been under way at the National Bureau of Standards for some time under a research fellowship maintained by the Porcelain Enamel Institute.



COLD-FINISHED STEEL WAREHOUSE: Jones & Laughlin Steel Corp. is putting the finishing touches on a $1 million expansion of laboratory and warehouse facilities for cold-finished steel at its Pittsburgh Works. New plant is designed for close quality control, includes modern testing apparatus, and affords ample storage capacity for a large number of grades and sizes

Get Far Greater Press Output!

on SIMPLE work...



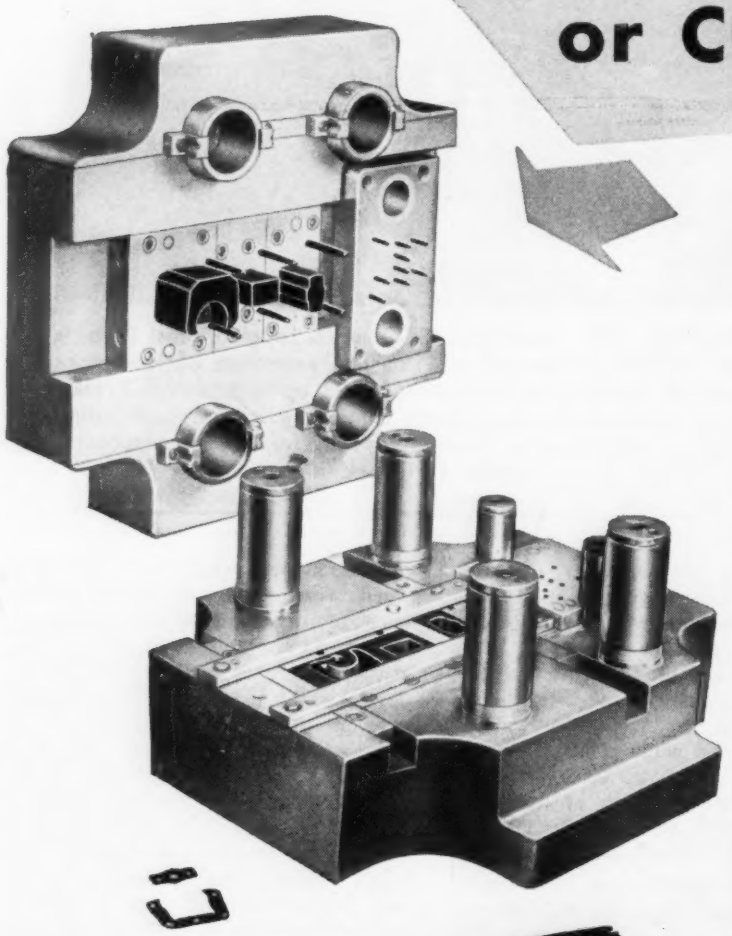
On a simple punching operation, this Carboloy punch and die lasted *12 times longer* than its steel predecessor!

In punching holes through abrasive Plaster Wallboard, steel dies wore .012" to .015" every 170 hours—

—while dies and punches of Carboloy Cemented Carbide show wear of only .0025" to .003" after 380 hours of continuous operation!

The Carboloy dies are bringing savings, not just in replacement *costs*, but in replacement *time*, as well.

or COMPLEX...



In complex dies, too, Carboloy brings the same longer die life, lower replacement costs and downtime, finer tolerances, better finishes.

This complex, five-station progressive die is an example. With unbelievable accuracy and efficiency, it produces millions of rotor and stator laminations.

Whether you need standard dies available from Carboloy; simple Carboloy dies that you can make in your own shop; or complex dies available through many die shops, you will find that Carboloy brings you advantages in drawing, cupping or blanking that you can find nowhere else.

A Carboloy engineer will gladly call on you any time to help you with any problem. Send for the Carboloy DIE ENGINEERING MANUAL, D-124, to find out more about the advantages Carboloy Cemented Carbide can give you.

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CEMENTED CARBIDE DIES

Engineering News . . . AT A GLANCE

"BUCKING" REELS— To simplify movement of heavy wire rope reels in its plant one western concern found it expedient to reinforce the forward end of an industrial truck with a heavy metal plate so that the reels could be "bucked" along the floor much in the manner in which a child rolls a hoop. According to the Electric Industrial Truck Association, three oval-shaped rollers incorporated in the forward plate permitted greater ease of operation in performing the task. The rollers are simply pushed against the periphery of the cable reels, the latter rolling ahead of the tractor. Same practice is used by the company in loading the reels into boxcars.

COMFORT FOR "THE BRAIN"— Heat radiated from 12,500 electronic tubes of a selective sequence electronic calculator, now in full operation at the headquarters of International Business Machines, New York, would be unbearable were it not for a "battery" of diffusers installed by Anemostat Corp. of America, to provide draftless air distribution for the comfort of operating personnel. Capacity of the air-conditioning system is equivalent to that derived from melting 52 tons of ice every 24 hours.

ADHESIVE THAT "WELDS"— A metal-to-metal bond that is resistant to shear tests up to 3500 pounds per square inch is provided by an unsupported film of pure adhesive developed recently by Minnesota Mining & Mfg. Co., St. Paul. Transparent and roughly resembling cellophane in appearance, the bonding material successfully "weathered" shear tests of 3500 pounds per square inch in bonding 0.064-inch aluminum Alclad to itself. In application the film is placed between units to be bonded, then cured by simultaneously applying heat and pressure—a heat of 300 to 500° F for 5 to 60 minutes, and a pressure of 25 to 100 pounds per square inch, both varying with type of bond desired. Film also is used to bond the same metal to fiber, wood and plastic surfaces.

DRY CLEANS PARTS— Method employed by American Airlines to clean dirt and grime on motors and equipment in its LaGuardia field overhaul base virtually amounts to a regular dry-cleaning process. Technique makes use of ordinary dry-cleaning fluid mixed with compressed air. Solvent, converted into a high-velocity spray by means of an air nozzle, dissolves or loosens deposits, while the air stream blows the detached matter away. Work in most instances is done in ordinary spray booths, solvent being drawn from a container attached to the booth. Air also is filtered to remove moisture, dust and any scale that might be in the supply lines.

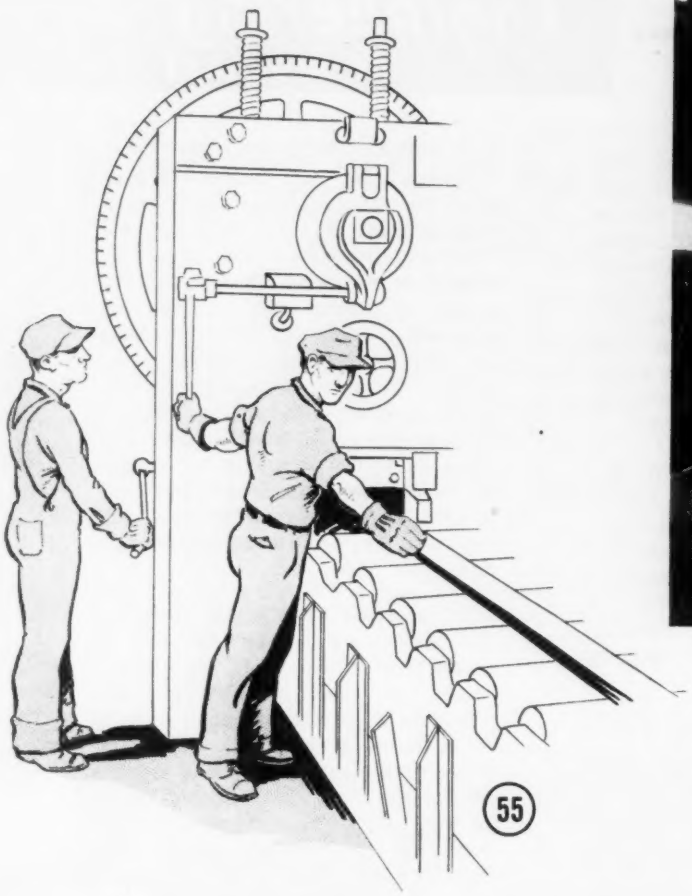
MICROTIME TECHNIQUE— Among the precision time measuring instruments and devices used by the Navy at its Michelson laboratory at Inyokern, Calif., is a novel all-electric camera capable of accurately "magnifying" time four million times. The camera, invented by Dr. A. M. Zarem, is being used primarily to study certain rapidly changing phenomena which heretofore science was unable to observe and record accurately. Acting as a sort of "time microscope"—the Navy calls it "synchronized microtime photography"—it is able to record accurately the spectrum of an electric spark or other electrical phenomena, giving within a millionth of a second, a record of stages of metallic composition, pressure or temperature. The camera is so fast that if pictures of a bullet leaving a gun muzzle were taken and projected on a screen at the normal rate, the missile would appear to require 6 hours to travel 25 feet.

OCCASIONAL SERVICES COUNT— Although it is only natural to consider the forging department of a forging plant the heart of activities, there are still other operations—nonforging in character—which are necessary to prepare the forgings for shipment. Some of these services are required on all forgings processed. Others are needed only on those specified. In any event, the occasional services must be available when they are necessary. Features of those services and how they fit into the forger's operations are fully described by Waldemar Naujoks. (p. 100)

"WRAP-AROUND" BURNING— Technique employed to burn fuel in a heating system for long metal pieces developed recently by R-S Products Corp. Philadelphia, permits conventional burners to saturate the work with heat. System is applicable to the forging or heat treatment of bars, slabs, pipe, tubing or other forms of long straight stock. Uniform heating from skin to core is accomplished, while surface scale, decarburization and grain growth are controlled precisely. (p. 105)

CUTS LOST MOTION—Table shifter handle, one of the details used on the machines built by Van Norman Co., Springfield, Mass., is designed to minimize motions of the operator. It locates and holds work accurately and positively, and is easy to operate. The piece is placed and removed with little motion or effort. (p. 122)

IMPORTANCE OF SCRAP—Ratio of 1:1 between home scrap and purchased scrap has remained fairly constant since 1935—the first year in which the Bureau of Mines published statistics on these materials. C. R. Holton, vice-president, Bethlehem Steel Co., points out that the importance of an annual consumption of about 25 million tons of purchased scrap that supplied by scrap dealers—in the nation's economy can hardly be overestimated—especially when one considers that production of a corresponding amount of pig iron would require the mining and transportation of approximately 50 million tons of iron ore, 35 million tons of coal and 10 million tons of limestone. Furthermore to produce this pig iron, the services of at least 50 or 60 blast furnaces would be needed. (p. 128)



FUNDAMENTALS OF Forging

Facilities for performing various nonforging services such as cutting bars and billets, trimming and punching, coining and sizing must be available in any efficient forging plant

IT is natural that the forging department of a forging plant should be considered the heart of the plant. It is the forging operations that impart to the forging the qualities of strength, toughness, and reliability. However, it is necessary to perform services of a nonforging character to the metal in process in the forging plant so that the forgings ready for shipment to the user are to the shape, size, and quality as specified by the user.

Some of the nonforging services are required on all forgings going through the plant. Others are required on forgings only where they are specified. The occasional services must be available when they are necessary.

Cutting Bars—First service usually performed is that of cutting the forging bars and billets into suitable lengths for use as forging stock. Bars and billets are received from the mills in the form of straight, round, square, or flat lengths. The length of the bars and billets is specified by forge plant and the lengths are usually as long as it is possible for the forge plant to handle. The longer the bar, the less wastage there is because of left-over short ends.

Average length of bars and billets is usually from 10 to 20 feet. Smaller size bars, up to about 1¼-inch in diameter or square, may be cut into lengths of 5 to 6 feet; forgings are worked from the end of these lengths. The larger size forging stock may be cut into suitable multiples. Stock may be cut into lengths to make one forging for each cut length, two forgings from each length, three, or perhaps four. There is no special rule for determining the multiple to which the bars will be cut, except by shape and weight of the forging to be made from the forging stock and the experience of the particular forging plant. Type of cutting equipment in the forging plant is also a factor to be considered in specifying stock multiples.

Cutting the bars and billets into suitable lengths of forging stock can be done by one of several methods. Where the forging plant has the several methods available in their cutting department, the use of a particular method depends upon the size and grade of steel or metal, and upon the forging requirements in making the part.

Cold Shearing—Cold shearing bars and billets is the most used method. This is the fastest and most economical of the several cutting methods. Type of shearing unit most generally used is the guillotine shears, which is a crack type of press designed for shearing operations. The lower blade is stationary and the upper blade is moved downward under pressure to perform the shearing operation. Cutting edges of the shearing blades are lined up so that the upper

Fig. 55 — Used to cut steel into predetermined lengths, this shear can cut a 5½-inch bar cold. Courtesy Drop Forging Asssociation

Fig. 56—Hot trimming flash from forging. Courtesy Hydraulic Press Mfg. Co.

Fig. 57—Forging being coined in large coining press. Courtesy Interstate Drop Forge Co.

By WALDEMAR NAUJOKS

Practice

Part VIII of the current forging series

blade moves past the lower blade.

The bar to be sheared is placed between the blades, with the front end of the bar pushed against a stop which has been adjusted to obtain the proper length of stock to be cut. Several kinds of shear blades are used. Straight blades are employed for general shearing operations. Blades with half round notches in each blade are used for shearing round bars. Blades with V notches are often used for shearing square stock. The square bar is placed so that one of the corners of the square rests downward in the V-notch.

Bar and billet shears for cold shearing are used mostly for low and medium carbon steels, and for many of the low carbon alloy steels where there is no danger of developing "shear cracks" at the ends of the shear cuts. Higher carbon grades of steel and the higher alloyed steels may be heated to a low red or a medium red temperature for a hot shearing operation. This avoids shear cracks. For hot shearing, it is important that the shear blades have the correct amount of blade clearance to reduce the amount of "drag" at the end of the shear cut. This drag, which is metal pulled out to form a fin at the end of the shear cut, is usually undesirable in the forging operation; it may be necessary to remove this fin by a grinding operation. Fig. 55 shows a typical bar shears.

Alligator shears, which can be considered as being similar to large power-operated tin snips, are sometimes used for small diameter bars or small sizes of flat stock. Alligator shears are used by some forging plants to cut up drop forging flashings. Cold shearing of billet stock in the low carbon grades is practical in sizes up to about 7 inches square.

Cold Sawing—Cold sawing of bar and billet stock is a method that has increased in use in the forging plant in recent years. The increased use is due, to a large extent, to the greater use of structural alloy steels that are not desirable to cut by shearing. Where an alloy steel is susceptible to shearing cracks, the stock is generally sawed. Square ends obtained by sawing are desirable and necessary for many forging operations, particularly where the stock is to be forged in an upend position.

Two types of cutting saws are used for cutting forging stock, the power hacksaw type and the circular cold-cut type. The power hacksaw uses a straight blade which is pulled across the bar or billet under suitable pressure to make a small cut. On the return stroke the blade is raised slightly to avoid dragging the blade teeth backwards, and causing undue wear on the blades. Power hacksaws are built to cut stock up to about 24 inches square.

The circular continuous cutting saw makes use of a circular cutting blade to perform a continuous cutting operation. It is often termed a cold cut saw. The circular continuous saw performs the cutting operation for a given size of stock much faster than does the hack saw type. However, the circular continuous saw takes a wider cut than does the hacksaw type. Average width of cut for the hacksaw is from ⅛ to 3/16-inch, while width of cut for the circular saw ranges from ¼ to about ¾-inch for each cut taken. Where the more expensive grades of alloy and stainless steels are being cut, the amount of metal being ground into chips is an important consideration.

Abrasive type of circular saw is used for materials that are too hard to cut either by shearing or by sawing with steel blades. An abrasive saw is similar to a thin grinding wheel, especially designed by cutting work. Abrasive saws tend to develop considerable heat in the bar; so a coolant is used.

Most of the commercial forging plants use cold shearing for the larger portion of their cutting of forging stock, since it is the fastest and most economical method. For a large share of the forging work, the sheared ends are sufficiently good. Sawing or abrasive cutting of stock is desirable on forging stock that is to be forged upend or on stock placed directly in the die impressions without appreciable preliminary preparation. Where stock is sheared for up-

end forging, it is necessary usually to grind the sheared ends to remove sharp corners and shearing rags at the end of the shearing cuts.

Trimming and Punching—Trimming and punching of drop forgings has been described and discussed previously with respect to the purpose of the operations and to the kinds of tooling used. These operations are similar to the shearing of bars and billets. For all shearing it is important to know some of the primary actions that govern the use of shearing equipment so that it may be used properly and without undue trouble.

Two basic considerations are the shearing edge and shearing clearance. The cutting or shearing edge is used to concentrate all of the shearing stresses at a single line and to do this, it is necessary and important that the blade edges are sharp. Dull or rounded blade edges tend to spread the stresses so that it takes more power to perform the shearing operation and dull edges tend to develop a more ragged cut.

Sharp shear corners concentrate the high shearing stresses at the blade contact lines. When stresses reach the ultimate strength of the steel or metal at the top and bottom contact lines of the blade edges, a fracture is started at each side of the bar where the blade edges make contact. As cutting continues, the two fractures continue to spread inward through the thickness of the metal towards the center of the bar until the fractures meet and cause the sheared piece to drop off.

The two fractures will meet only if the two shearing blades have the proper clearance between them. If the blades are too close together, or too far apart, the fractures go past each other and the shearing blades cut the thin plate that still holds the piece to the bar. This is termed "secondary shearing". Secondary shearing is seen on the cut ends in the form of a heavy fin or rag. All metal being sheared has a tendency to pulling when sheared or punched; amount of pull depends upon the softness or hardness of the metal. Soft metals tend to pull more than do the harder metals. Amount of proper blade clearance depends upon the metal being sheared. Depth of penetration of the shearing stresses depends upon the softness or hardness of the metal being sheared.

For softer metals, depth of shearing stress penetration may be as much as 30 per cent and as the metal increases in hardness the depth of penetration is reduced. The greater the depth of stress penetration, the greater is the amount of blade clearance between the blades. Blade clearance for the softer metals is fairly large; as the metal hardness increases, the blade clearance is reduced. A study of fractures made by the shearing blades will indicate whether the clearance is correct, whether there is too much or too little clearance.

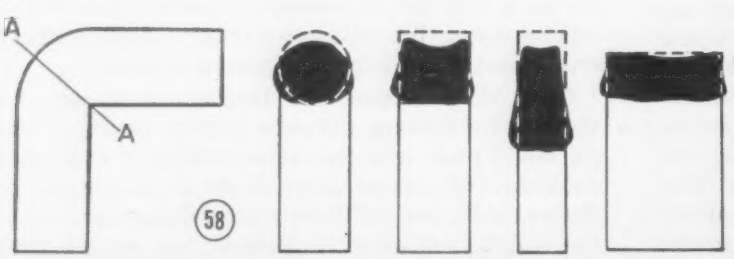
Previous articles in the current forging series appeared in the following issues of STEEL: June 7, p. 100, June 21, p. 98, July 5, p. 76, July 19, p. 99, Aug. 2, p. 91, Aug. 16, p. 94, Aug. 30, p. 59

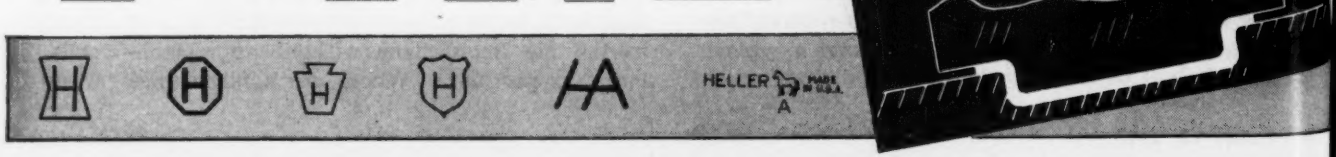
Sharp Cutting Edges—Importance of sharp cutting edges cannot be stated too often or too emphatically. Sharp edges allow the power shears to perform the operation without undue strain on the machine and make a clean square cut on the forging stock. Dull blades cause dragging to make a poor cut end and in spreading the stresses over a larger area of metal being cut, dull blades also put excessive strains on the bearings and frame of the shears. These excessive strains cause faster wear and breakage on the shears. For practical shearing operations on bar stock, in the trimming of flash from drop forgings, and in all punching operations, it is good practice to check all of the shearing tools to be assured that the shearing edges are sharp and that blade clearances are correct for the grade and hardness of metal being cut.

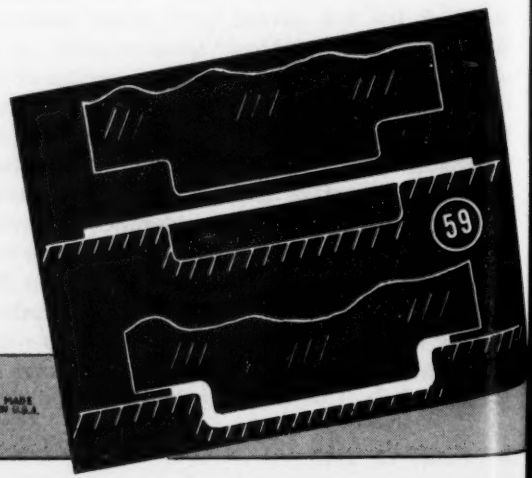
Pressures required for shearing can be calculated by length of shearing cut and thickness of the metal. While shearing strength of most metals is considered as being about 80 to 85 per cent of the ultimate strength, it is safe to use ultimate strength in the calculations. Most press and shear manuals contain the necessary figures and data for calculating the necessary size of shears or press for shearing, trimming, or punching operations. Fig. 56 shows the trimming of flash from a drop forging.

Coining and Sizing—Coining and sizing are press operations in which small areas of metal are squeezed under heavy pressure to obtain smooth surfaces and closer tolerances than are obtainable by normal forging operations. Other comparable operations in the squeeze group are ironing and planishing. All of these operations require heavy pressures over small areas of metal.

Coining was used originally to make coins where the softer metals such as gold, silver, copper, and bronze were pressed into the shape of a coin by the use of a power press. Coin-making is a cold squeez-







ing operation. Development of the power press has extended its use to the squeezing of harder metals such as iron and steel. Today, mechanical presses of the toggle type, slow speed eccentric presses and hydraulic presses are used to perform the squeeze operations on bosses and flat surfaces to smooth them and size them to relative close tolerances.

Heavy pressures, ranging from about 500 tons to about 3000 tons are used over small areas to squeeze either cold or semi-hot metal for closer tolerances. Bosses on arm forgings, crankshaft and wrist pin ends on connecting rods, bosses on shifter forks, hubs on gear blanks, pinions, and many similar parts with small flat areas are coined or sized to close tolerances. Tolerances obtainable on sections being coined depend upon area and size of coining press being used. For cold coining forgings in the low carbon steels, tolerances of plus and minus 0.005-inch are normal. In some instances, tolerances of plus 0.002 to 0.003-inch are practical. Fig. 57 shows forging being coined in a large coining press.

Ironing—Ironing is a squeeze operation used to impart a smooth surface on some part of the forging. The terms coining and ironing have been used interchangeably. For small forgings, this operation may be performed cold and for larger areas, the surfaces may be ironed smooth with the forging at a low red temperature. Generally, the ironing operation is more concerned with smoothness of the surface than with dimensional tolerances, but ironing and sizing may be a combined operation in which smoothness of surface and a close weight tolerance are both important. It should be remembered that it is not desirable or practical to iron all drop forgings, but ironing, coining, or sizing are practical on many of the smaller sizes of forgings.

Planishing is an operation similar to coining or sizing, for getting close tolerances on diameters and spheres. The planishing operation is given to small forgings that can be rotated in a set of dies in a fast press. After a squeeze by the press, the piece is rotated a part of a revolution and squeezed again. Several squeezing blows under the fast press will impart a smooth surface to close tolerances. Small pieces in low carbon steels may be planished cold. Larger pieces, or small pieces in higher carbon or alloy steels may be planished at a low red temperature.

Forming—Forming is a press operation designed to bend, twist, or move the various sections of a forging into different relation to each other than the positions obtained in the forging opeartions. Small die impression forgings may be formed to the desired shape in a regular mechanical crank press or in a hydraulic press. Larger forgings may be formed in a "bulldozer", which is a press operating in a horizontal position and which is designed for large clearances to perform the forming operations. It is often advantageous to open up a forging for the forging operation and then to bend or form the forging into its final shape.

Where a forming or bending operation is used, it is necessary to know how the metal moves at the point or points of forming or bending. Where a bar with a uniform cross-section is being bent, the tendency for the metal inside of the neutral axis is to compress and gather, while the metal outside of the neutral axis tends to stretch. If the bend is on a fairly large radius, stretching on the outside of the neutral axis and compressing on the inside of the neutral axis is not very noticeable. On short, sharp bends, however, the metal shows an appreciable gather and spreading on the inside of the bend, and a definite stretching out and narrowing on the outside of the bend.

Section thickness across the bend is smaller than the original thickness of the bar. Fig. 58 shows the effects of short bends on round, square and flat bars. This tendency affects the sections regardless of whether the bending is performed hot or cold. For all bending and forming operations, it is necessary to know the amount of stretching for the particular bend so that due allowance can be made for it in the forging. This will insure full sections in the forging when it has its final shape.

Springback—Springback is another tendency that must be given consideration in bending or forming operations. All metals have a tendency to return slightly to their original position after bending. This tendency is termed "springback". Springback is always present in bending or forming in either cold or in hot bending. The greater amount of springback is present in cold bending. For hot bending operations, the springback may be from 1 to 5 per cent, depending upon the amount of bending, the grade of material being bent, and the temperature of the bending operation.

Allowance made to compensate for the springback by bending a bit further than the final shape, is termed "overbend". Springback in cold bending operations is much greater than in the hot bending operations and allowance must be made for the springback. It is difficult to present a set of rules for cold bending, since the grade of material, the size of the section, the amount of (*Please turn to Page* 126)

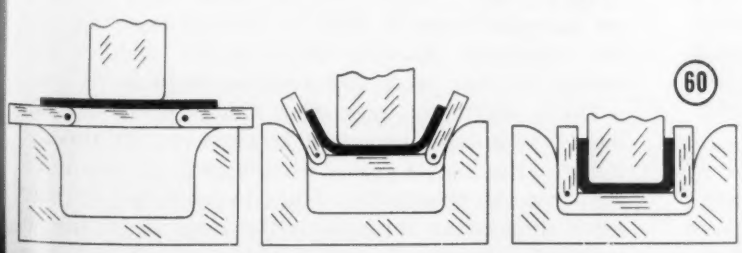


Fig. 58—*Effect of bending bars with sharp bend. All cross-sections are shown for position at A-A. Sharper the bend at the inside corner at A-A, the more pronounced is distortion at bend*

Fig. 59—*Simple press bending dies*

Fig. 60—*Schematic sketch of folding forming press dies. Variations of this principle are used for a variety of formed forgings*

Seen and Heard in the Machinery Field

By GUY HUBBARD
Machine Tool Editor

REGISTRATION OF ENGINEERS: There has just come to my desk a review copy of a book entitled *Professional Registration Laws and the Engineer.* This is by my friend A. M. Sargent, president and general manager, Pioneer Engineering & Mfg. Co., Detroit. Mr. Sargent was moved to write this book as a result of situations with which he came in contact while he was president of the American Society of Tool Engineers.

The author, himself a registered professional engineer and holder of a doctor's degree in engineering, has made a detailed study of the licensing laws for engineers now on the books in 48 states, the territories of Alaska, Hawaii and Puerto Rico, and in all but one of the Canadian provinces. He points out that while they have not been strictly enforced to date—and are little known even among engineering and management groups—there may come a day when they will be enforced. That will be a day of surprise and confusion throughout the engineering profession.

Mr. Sargent says: "It is the purpose of this book objectively to examine the public necessity for such laws, to call attention to the effects which strict enforcement would have upon industry and society in general, to discuss the general requirements of these laws, and to point out some of the potentially dangerous practices open to administrative officials who are granted broad and vaguely defined powers."

If you as an engineer want to find out just how you stand in this registration picture—and what you should do about it—you can get a copy of this book for 75 cents by writing to A. M. Sargent, 19669 John R Street, Detroit 3, Mich.

MACHINE TOOL CASTINGS: Now that an agreement has been arrived at between Republic Steel and Kaiser-Frazer in regard to operation of the big WAA blast furnace in Cleveland, a lot of machine tool builders have breathed a sigh of relief. For a while things looked black to them as far as supplies of pig iron were concerned. They were "caught in the middle" in this affair.

This crisis focused attention on the dependence of this basic industry on high grade gray iron castings at a time when the machine tool builders again are faced with the responsibility of a national defense program. Despite the increased use of weldments in the construction of broaching machines and special machine tools, as well as those of certain others where high stresses are involved, cast iron and various alloys thereof continues to be a predominating construction material and runs into large tonnage as compared to other materials used in machine tool building.

Some of the finest iron castings made today are for machine tools, also some of the most intricate ones and some of the largest ones. Visit any important machine tool plant today and examine the castings, both in rough and finished condition. I believe that you will join with me in "taking off your hat" to the pattern makers who make the patterns for these complicated castings and the foundrymen who cast them. In my estimation many of them are masterpieces.

Every time I visit a machine tool plant I see beds, frames, slides, uprights, etc., whose beautifully finished machined and scraped surfaces not only are free from blow holes but even are free from "pin point" blemishes. Some of these castings are made by builders' own foundries, others are made by outside foundries which specialize in machine tool work. I know some of the latter which have such reputations of excellence that they are shipping heavy castings to customers more than 600 miles away.

When I was starting my career in the machine tool industry, I found it greatly to my advantage to cultivate the good will of men in the pattern shop and the foundry. I recommend that as still being a smart thing to do.

BROACHING COMES OF AGE: As I write this, I am on the eve of taking off for Ann Arbor, Mich., for a preview of one of the largest broaching machines ever built. It is indicative of the extent to which mass production methods have come to the railway industry with the advent of the diesel locomotive, that this big external broaching machine is tooled up for the production of a railway diesel part.

When I began work in the shop there was no such thing as surface broaching. The broaching which we did was confined to single keyways in pulleys and gears, and our old-fashioned horizontal broaching machine used to make "heavy weather" even of that job. Anything like the multiple spline work which is so common today, not only would have stalled that machine but would have stumped the men who made our broaches.

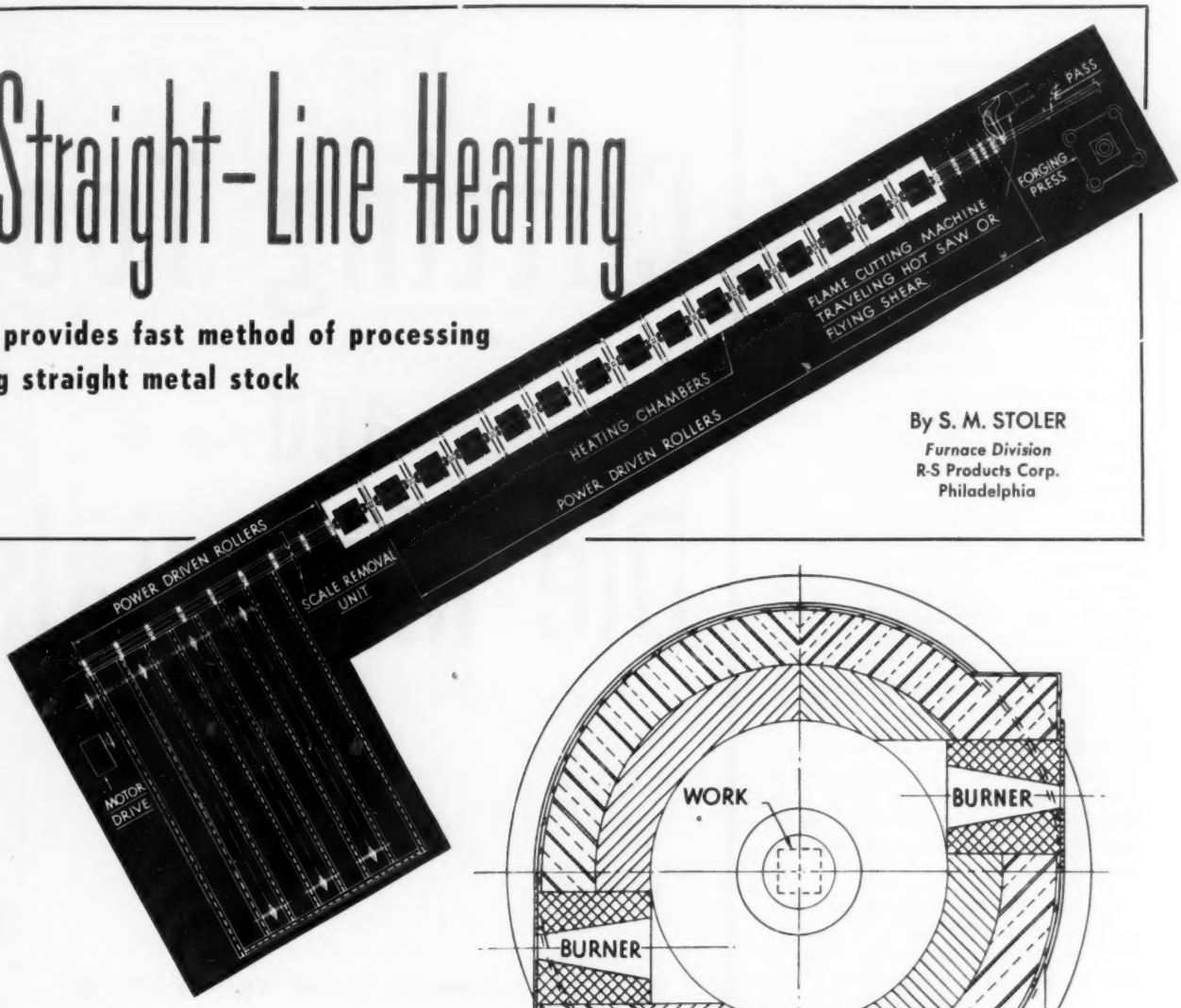
Thirty-three years ago, no one dreamed that broaching ever would become a rival of milling. Today that rivalry is such a recognized fact that one of the largest manufacturers of milling machines has gone into the broaching machine business and another has bought into the broaching machine business.

There are many interesting things about broaching. One is that inspection keeps pace with production for the simple reason that broach engineers design into the broach the ability to reproduce work to exact dimensions throughout the long useful life of the tool. Another is that while a broach combines roughing and finishing, no individual tooth handles both functions.

Straight-Line Heating

. . . provides fast method of processing long straight metal stock

By S. M. STOLER
Furnace Division
R-S Products Corp.
Philadelphia



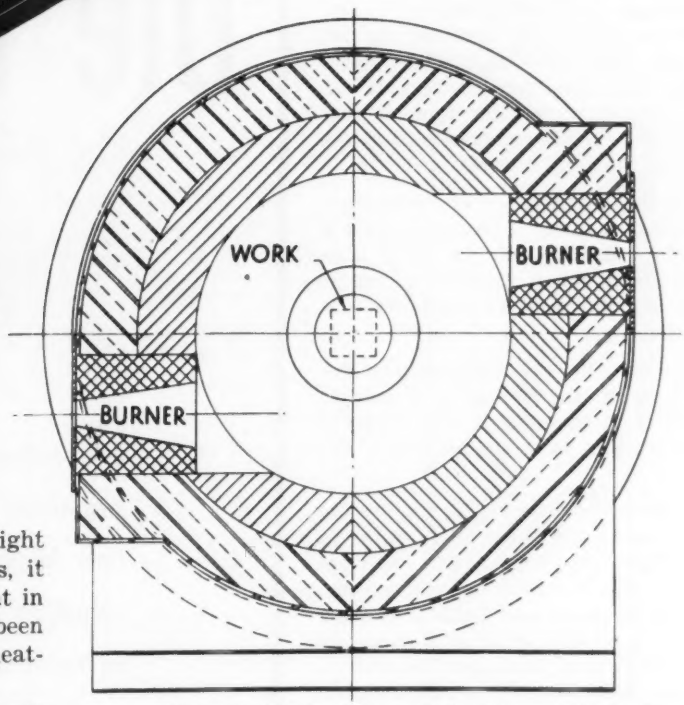


Fig. 1 (top)—Plan of heating equipment. Long-length billets are crane-loaded onto feed table at left, whence they are picked up by power-driven rollers and carried into a scale-removal unit

Fig. 2 (bottom)—Transverse vertical section through heating chamber

ALTHOUGH continuous heating of long, straight metal stock is not unknown in the metal trades, it yet remains a fact that batch heating is prevalent in many industries. Only recently have techniques been developed whereby continuous, production-line heating is made both practicable and profitable.

Essence of this technique lies in the use of an extremely high thermal head in multiple heating chambers through which the workpieces are rapidly passed by mechanical means. Uniform heating from skin to core is thus accomplished, while surface scale, decarburization and grain growth are precisely controlled, resulting in high quality output. With the fast-moving mechanization inherent in a continuous operation, labor costs are profoundly affected.

The R-S Hi-Head heating system for metals is a modern method for rapid production of either commercial or ordnance requirements. The plan (to name a single example of its application) enables two men and one integrated heating system to do the work formerly done by eight men and three conventional heating units. It is applicable to the forging or heat treatment of bars, slabs, pipe, tubing or other forms of long straight stock.

Equipment Integrated—These results are achieved by integration of function and equipment to eliminate intermediate steps, and by a "wrap-around" fuel-burning technique which permits reliable conventional oil or gas burners to saturate the work with heat. Because of its application to current ordnance needs the forging system is chosen as an example of many heating applications of the new R-S heating systems. Heating of billets in preparation for forging into shells is illustrated by this example.

Fig. 1 shows plan of the equipment. Long-length billets are crane-loaded onto feed table at left, whence they are picked up by power-driven rollers and carried into a scale-removal unit. Here everything but rolled-in scale is removed. The billets pass through a sequence of heating-chambers in the line of flow

and are supported between individual chambers on alloy rollers. Openings for entrance and exit, and the spaces between cells, are such as to permit escape of enough hot gases to sustain increasing temperature of the advancing billet.

Heating chambers are furnished with conventional oil burners in opposition above and below the longitudinal axis of the work. Hence, the "wrap-around" action of the burning gases at high velocities. The tremendous Btu input to the chambers is controlled in four zones: First two by radiation pyrometers, the last two by optical pyrometers which scan the work as it approaches the final chamber and increase or decrease the supply of fuel necessary to achieve the desired temperature at the point of emergence. Auxiliary control is exercised manually by the operator, who can increase or decrease feed table and roller speed while the pyrometers compensate for the greater or smaller flow of fuel needed to sustain emergence-temperature at the proper level.

As the heated billet emerges from the final chamber it passes beneath a synchronized hot-saw or other cutting-device which cuts it to desired lengths that are required for the forging press.

A steel billet 3½-inches square (regardless of length) can be heated to 2300° F in 14 minutes, with uniform heat conduction to the interior of the billet.

Low Maintenance — There are no large furnace bottoms to be distorted by high mechanical and thermal loads. Hence, there is no downtime for replacement of hearths. Absence of scale on the work cuts wear and tear on cutting tools and dies and reduces replacement or conditioning cost.

The penalty of mill or forge delay is small since there is only a few minutes' supply of material in process at any one time. This can often be rushed through to completion before the delay is paralyzing. If material in process must be sacrificed, the quantity is trifling as compared with what would ordinarily be found in a batch furnace.

Condition of the heated material, essentially free of scale or decarburization, reduces the time for machining because the metal is of unusually good quality and work surfaces are clean. Rapid heating also inhibits grain growth. Heat penetrates so rapidly that grain sizes remain small; yield point, tensile strength, and elongation are improved.

Cutting Tool and Die Materials

FIFTH OF A SEVEN SECTION SERIES

This information on cutting tool and die materials prepared by the editors of STEEL lists factors to be considered in the quick selection of tool steels and carbide types to meet any given requirement. Sources, trade names and applications are conveniently presented. Other pertinent data include chemical analyses, heat treatments, quenching media, movement in hardening and machinability as annealed

Previous data on tool and die materials appeared in the following issues: p. 98, Aug. 16, 1948; p. 82, Aug. 23, 1948; p. 64, Aug. 30, 1948; p. 96, Sept. 6, 1948

PRIMARY APPLICATION	TRADE NAME & TYPE	ANALYSIS (%)	SUGGESTED TEMPERATURE RANGES (°F)						Quenching Medium ★ % Machinability Annealed. Movement in Hardening.
			Forging	Finish Forging	Annealing	Preheating	Hardening	Tempering	
JESSOP STEEL CO., 500 Green St., Washington, Pa.									**Listing No. 29**
Cold Heading	NEW PROCESS COLD HEADER Water Hardening	C .94, Mn .25, Si .18	1500– 1650	....	1350– 1400	....	1450– 1475	350– 550	Water Mach. 100 Movement B
Cold Work Dies (Lamination dies, etc.)	CNS Air Hardening	C 1.55, Mn .30, Cr 12.00, Mo .80, V .25, Si .40	1900– 1950	Above 1650	1600	1300– 1400	1750– 1800	750– 800	Air Mach. 85 Movement B
Cold Work Dies (Lamination Dies, etc.)	WINDSOR Air Hardening	C 1.00, Mn .45, Cr 5.25, Mo 1.10, V .25, Si .25	1900– 1950	Above 1600	1600	1300– 1400	1800– 1850	750– 850	Air Mach. 85 Movement B
Cold Work Dies (Lamination Dies, etc.)	3C Oil Hardening	C 2.15, Mn .42, Cr 12.00, W .25, V .20, Co .20, Si .45	1900	Above 1650	1600– 1625	1300– 1400	1800	800– 950	Oil Mach. 75 Movement B
Cold Work Dies	LION Water Hardening	C 1.00, Mn .30, Si .25	1500– 1650	....	1350– 1400	....	1450– 1475	350– 550	Water Mach. 100* Movement B
Cold Work Dies	LION EXTRA Water Hardening	C 1.00, Mn .30, Si .25	1500– 1650	....	1350– 1400	....	1450– 1475	350– 550	Water Mach. 100* Movement B
Cold Work Dies	SPECIAL OIL HARDENING Oil Hardening	C .95, Mn 1.75, Si .35	1700– 1800	Above 1400	1380	....	1450– 1500	200– 400	Oil Mach. 100 Movement A
Cold Work Dies	TRUFORM Oil Hardening	C .90, Mn 1.17, Cr .50, W .50, Si .30	1700– 1800	Above 1400	1380	....	1450– 1500	200– 400	Oil Mach. 100 Movement B
Cold Work Dies	WASHINGTON Water Hardening	C 1.00, Mn .30, Si .25	1500– 1650	....	1350– 1400	....	1450– 1475	350– 550	Water Mach. 100* Movement B
Cutting Tools	MOGUL High Speed	C .77, Mn .25, Cr 3.80, W 1.50, Mo 8.70, V 1.15, Si .30	2000– 2050	1700– 1800	1550	1200– 1550	2150– 2250	1050	Oil Mach. 60 Movement B
Cutting Tools	MUSTANG High Speed	C .84, Mn .25, Cr 4.20, W 6.35, Mo 5.00, V 1.95, Si .25	1900– 2050	1650– 1800	1550	1400– 1450	2200	1040	Oil Mach. 60 Movement B
Cutting Tools	PURPLE LABEL High Speed	C .73, Mn .28, Cr 4.10, W 18.25, Mo .50, V 1.10, Co 5.00, Si .28	2000– 2050	1650– 1800	1600– 1625	1550– 1650	2325– 2425	1050	Oil Mach. 60 Movement B
Cutting Tools	PURPLE LABEL EXTRA High Speed	C .78, Mn .28, Cr 4.00, W 18.25, Mo .80, V 1.90, Co 8.00, Si .28	2000– 2050	1650– 1800	1650	1550– 1650	2325– 2425	1050	Oil Mach. 60 Movement B
Cutting Tools	SUPREMUS High Speed	C .73, Mn .28, Cr 4.00, W 18.00, V 1.10, Si .28	1900– 2050	1650– 1800	1600– 1625	1400– 1500	2300– 2400	1050	Oil Mach. 60 Movement B
Cutting Tools	SUPREMUS EXTRA High Speed	C .83, Mn .30, Cr 4.25, W 18.50, Mo .65, V 2.10, Si .25	1900– 2050	1650– 1800	1600– 1625	1400– 1500	2300– 2400	1050	Oil Mach. 60 Movement B
Cutting Tools	(See CNS, TRUFORM, WINDSOR, 3C, Listed Above)								
Cutting Tools (Roughing, Finishing)	(See LION, LION EXTRA, WASHINGTON, Listed Above)								
Die Casting Dies	DICA A Oil Hardening	C .42, Mn .75, Cr 1.00, Mo .20, Si .25	....	....	1500	....	1525– 1575	400– 1000	Oil Mach. 80 Movement B
Die Casting Dies	DICA B Air Hardening	C .34, Mn .35, Cr 4.85, W 1.15, Mo 1.50, V .20, Si .95	1900– 1950	above 1600	1500– 1550	....	1825– 1850	900– 1200	Air Mach. 75 Movement B
Die Casting Dies	DICA D	C .36, Mn .30, Cr 5.00, W 5.00, Mo .25, Si 1.00	....	....	....	....	....	....	
Die Casting Dies	3-C SPECIAL Air Hardening	C 1.45, Mn .30, Cr 12.50, Mo .80, Co 3.20, Si .40	1900	above 1650	1600– 1625	1300– 1400	1800	800– 950	Air Mach. 75 Movement B
Gages	(See SPECIAL OIL HARDENING, TRUFORM, Listed Above)								
Hot Work Tools & Dies	J HOT WORK Air Hardening	C .62, Mn .35, Cr 3.80, Mo .55, Si .35	1900– 1950	above 1600	1500	1400	1700– 1800	900– 1200	Air Mach. 75 Movement B
Hot Work Tools & Dies	JJ HOT WORK Air Hardening	C .92, Mn .35, Cr 3.80, Mo .55, Si .35	1900– 1950	above 1600	1500	1450	1700– 1750	700– 1100	Air Mach. 75 Movement B
Hot Work Tools & Dies	2B-HC Oil Hardening	C .49, Mn .30, Cr 2.90, W 11.25, V .35, Si .30	2000	above 1600	1575– 1600	1500– 1600	2100– 2200	1000– 1200	Oil, Air Mach. 75 Movement B
Hot Work Tools & Dies	2B-LC Oil Hardening	C .32, Mn .30, Cr 3.25, W 9.50, V .45, Si .30	2000	above 1600	1575– 1600	1550– 1600	2000– 2200	800– 1200	Oil, Air Mach. 75 Movement B
Hot Work Tools & Dies	2B-MC Oil Hardening	C .39, Mn .30, Cr 3.10, W 13.30, V .35, Si .30	2000	above 1600	1575– 1600	1550– 1600	2000– 2200	800– 1200	Oil, Air Mach. 75 Movement B
Shear Blades, Chisels, Dies, Forming Tools, Punches	RTS Oil Hardening	C .55, Mn .50, Mo .45, Si .80	1900– 2000	above 1600	1350– 1375	....	1550– 1575	350– 900	Oil Mach. 90 Movement B
Shock Resisting Tools, Chisels	MAGIC Oil Hardening	C .53, Mn .90, Mo 1.10, V .15, Si 2.00	1800	above 1500	1440	....	1625	400– 1200	Oil, Water Mach. 75 Movement B
Shock Resisting Tools (Pneumatic Tools), Shear Blades	TOP NOTCH Oil Hardening	C .56, Mn .33, Cr 1.25, W 2.30, V .20, Si .30	1800– 1900	above 1400	1420– 1450	....	1650– 1700	375– 1100	Oil Mach. 80 Movement B
Tools & Dies (Shallow Hardening)	WASHINGTON SPECIAL Water Hardening	C 1.00, Mn .33, V .20, Si .20	1500– 1650	....	1350– 1400	....	1450– 1475	350– 550	Water Mach. 90 Movement B

* Readily Machinable.

★ Last column indicates suggested Quenching Medium; Machinability Annealed using base 100 for carbon and low alloy steels; and Movement in Hardening by "A" for slight, "B" for intermediate, "C" for considerable movement—"+" denotes expansion, "—" denotes contraction.

PRIMARY APPLICATION	TRADE NAME & TYPE	ANALYSIS (%)	SUGGESTED TEMPERATURE RANGES (°F)						Quenching Medium. ★ % Machinability Annealed. Movement in Hardening.
			Forging	Finish Forging	Annealing	Preheating	Hardening	Tempering	
KLOSTER STEEL CORP., 224 N. Justine St., Chicago 7, Ill.									**Listing No. 30**
Cold Work Dies	PURE-ORE AIR-CHROM Air Hardening	C 1.00, Mn .57, Cr 5.30, Mo 1.0, V .26, Si .23	1950	1650	1550	1200	1775	350–1000	Air
Cold Work Dies	PURE-ORE EN-97	C .58, Mn .40, Cr .80-.90, Mo .42, Si .28, Ni 3.25	1900	1600	1300	1200	1500	350–900	Oil
Cold Work Dies	PURE-ORE EXTRA Water Hardening	Carbon as desired	1850	1475	1425	1150	1450	300–900	Water
Cold Work Dies	PURE-ORE ROLMO	C 1.00, Mn .29-.35, Cr 1.15-1.25, Mo .35-.40, Si .36	1850	1450	1425	1150	1550	300–500	Oil
Cold Work Dies	PURE-ORE SPECIAL Water Hardening	Carbon as desired	1850	1475	1425	1150	1450	300–900	Water
Cold Work Dies	PURE-ORE STANDARD Water Hardening	Carbon as desired	1850	1475	1425	1150	1450	300–900	Water
Cold Work Dies	PURE-ORE No. 14	C 1.00, Mn .35, Cr .45, Si .23	1850	1475	1425	1150	1450	300–500	Water
Cold Work Dies	PURE-ORE No. 25	C 1.20, Mn .35, Cr .60-.80, W 1.30, V .15-.25, Si .30	1900	1650	1450	1200	1500	300–375	Water
Cold Work Dies (Blanking, Forming)	PURE-ORE HI-RUN Hi-Chrome, Hi-Carbon	C 1.50-1.60, Mn .35, Cr 11.50-12.50, Mo .75-.90, V .25-.35, Si .40-.50	2000	1700	1600	1150	1825	300–1050	Air
Cold Work Dies	KLOSTER SWED-OIL Oil Hardening	C .95-1.00, Mn 1.10-1.20, Cr .45-.50, W .45-.50, V .20, Si .25-.35	1850	1550	1425	1150	1475	300–500	Oil
Cutting Tools	PURE-ORE CLIPPER High Speed	C .55-.75, Mn .15-.35, Cr 3.80-4.25, W 17.75-18.50, V .90-1.25, Si .20-.35	2000	1700	1600	1550	2350	1050–1100	Oil
Cutting Tools	PURE-ORE COBALT High Speed	C .72-.80, Mn .25-.30, Cr 4.00-4.50, W 13.75-14.75, Mo .40-.60, V 2.00-2.50, Co 4.75-5.25, Si .20-.30	2100	1950	1600	1600	2425	1050–1100	Oil
Cutting Tools	PURE-ORE FINISHING	C 1.30, Mn .35, W 3.50, Si .35-.45	1900	1650	1450	1200	1550	300–375	Water
Cutting Tools	PURE-ORE PRIOR High Speed	C .78-.84, Mn .25-.35, Cr 4.00-4.50, W 18-19, Mo .50-.80, V 2.00-2.25, Si .20-.50	2150	1950	1600	1600	2400	1050–1100	Oil
Hot Work Dies	PURE-ORE D-C-33 Hot Work	C .33, Mn .20-.40, Cr 4.50-5.50, W 1.35-1.75, Mo 1.45-1.85, Si .85-1.25	1900	1650	1550	1200	18 0	1050–1250	Air
Hot Work Dies	PURE-ORE D-C-66 Hot Work	C .30, Mn .31-.43, Cr 3.50, W 8.50-9.00, V .27, Si .29-.36	1950	1700	1550	1550	2150	1050–1250	Air
Hot Work Dies	PURE-ORE KLS-44 Hot Work	C .57, Mn .51, Cr 1.01, Mo .92, Si .28, Ni 1.43	2100	1750	1425	1200	1600	600–1200	Oil, Air
Shock Resisting	PURE-ORE CHIZ-ALLOY	C .45, Mn .30, Cr 1.00-1.25, W 2.50, Si .90, V .20-.25	2000	1650	1475	1200	1700	300–500	Oil
Shock Resisting	PURE-ORE SUPER ALLOY	C .45-.50, Mn .35, Cr 1.25, W 2.25-2.50, V .20-.25, Si .90-1.00	2000	1650	1475	1200	1700	300–1050	Oil

KENNAMETAL INC., Latrobe, Pa. — **Listing No. 31**

Cutting Tools (Heavy rough turning, forged, rolled steel) — KENNAMETAL KM, Carbide

Cutting Tools (Moderate, finishing cuts, steel) — KENNAMETAL K3H, Carbide

Cutting Tools (Abrasive cuts on steel, large nose radius, or tools that dwell) — KENNAMETAL K4H, Carbide

Cutting Tools (Heavy roughing, cast steel, scaly, sandy cast iron) — KENNAMETAL K2S, Carbide

Cutting Tools (Hard steels, precision boring) — KENNAMETAL K5H, Carbide

Cutting Tools (Heavy roughing or planing of cast iron) — KENNAMETAL K1, Carbide

Cutting Tools (General machining, cast iron, nonmetallics) — KENNAMETAL K6, Carbide

Cutting Tools (Fine finishing cuts, precision boring on cast iron) — KENNAMETAL K-8, Carbide

Heat Resistant Applications (Corrosion Resistant) — KENNAMETAL K13S, Carbide

Rock Cutting Tools — KENNAMETAL K12, Carbide

Shock Resisting Applications — KENNAMETAL K2S, Carbide

Shock Resisting Applications — KENNAMETAL K12, Carbide

Wear Resistant Applications — KENNAMETAL K6, Carbide

Wear Resistant Applications (Nongalling) — KENNAMETAL KM, Carbide

Wear Resistant Parts (Adaptable to long slender extruded shapes) — KENNAMETAL KE5, Carbide

Wear Resistant Parts (Adaptable to long slender extruded shapes) — KENNAMETAL KE7, Carbide

Cutting Tools (Heavy roughing or planing of cast iron) ..... KENNAMETAL K2, Carbide

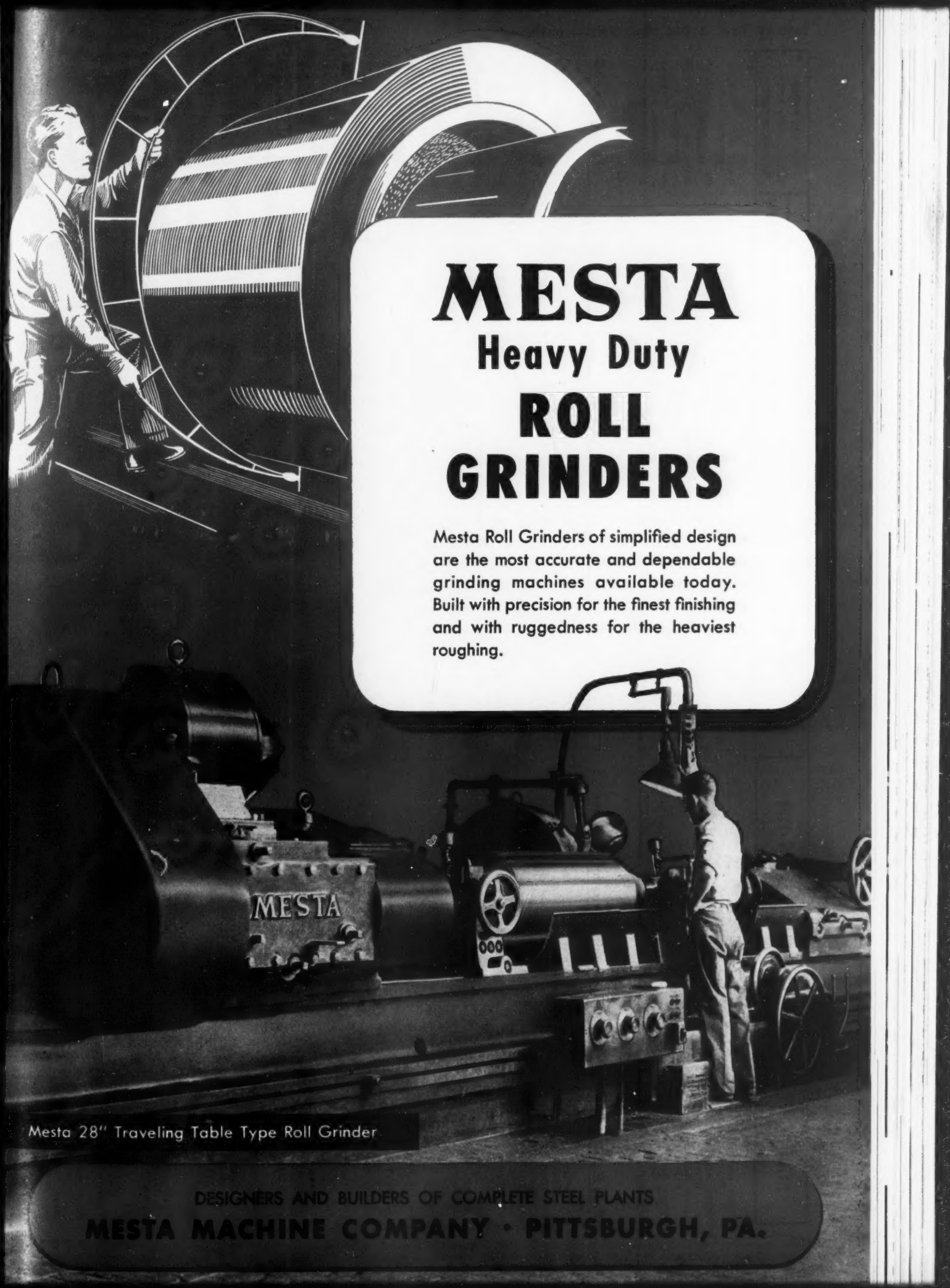
Cutting Tools (General machining, cast iron, nonmetallics) ..... KENNAMETAL K6, Carbide

Wear Resistant Parts (Adaptable to long slender extruded shapes) ..... KENNAMETAL K68, Carbide

Wear Resistant Parts (Adaptable to long slender extruded shapes) ..... KENNAMETAL KE7, Carbide

PRIMARY APPLICATION	TRADE NAME & TYPE	ANALYSIS (%)	SUGGESTED TEMPERATURE RANGES (°F)						Quenching Medium. ☆ % Machinability Annealed. Movement in Hardening.
			Forging	Finish Forging	Annealing	Preheating	Hardening	Tempering	
LATROBE ELECTRIC STEEL CO., Latrobe, Pa.									**Listing No. 32**
Cold Work Dies (Blanking)	COBALT CHROME Air Hardening	C 1.35, Mn .25, Cr 12.50, Mo .65, Co 3.15, Si .50	1950–2000	1750*	1625–1650	1200–1250	1825–1850†	400–1100	Air, Oil Mach. 60 Movement +A
Cold Work Dies (Blanking)	OLYMPIC Air Hardening	C 1.50, Mn .30, Cr 12.00, Mo .75, V 1.00, Si .30	1850–1900	1700*	1600–1650	1200–1250	1800–1850†	300–700	Air, Oil Mach. 60 Movement +A
Cold Work Dies (Cold Forming)	CARBON COLD HEADER Water Hardening	C .93, Mn .25, Cr .10 Max., V .20, Si .20	1750–1850	1600*	1425–1450	1200–1300	1450–1650†	300–600	Water Mach. 100 Movement —B
Cold Work Dies (Cold Forming)	CARBON COLD HEADER NO-V Water Hardening	C .93, Mn .25, Cr .10 Max., Si .20	1750–1850	1600*	1425–1450	1200–1300	1450–1650†	300–600	Water Mach. 100 Movement —B
Cold Work Dies (Cold Forming)	CARBON COLD HEADER + Mo Water Hardening	C .93, Mn .25, Cr .10 Max., Mo .30, Si .20	1750–1850	1600*	1425–1450	1200–1300	1450–1650†	300–600	Water Mach. 100 Movement —B
Cold Work Dies (Cold Forming)	C. F. S. Water Hardening	C 1.00, Mn .25, Si .20	1750–1800	1600*	1425–1450	1250	1450–1500†	300–600	Water Mach. 100 Movement —B
Cold Work Dies (Cold Forming)	EXTRA CARBON Water Hardening	C 1.01, Mn .25, Si .23	1750–1800	1600*	1425–1450	1250	1425–1500†	300–600	Water Mach. 100 Movement —B
Cold Work Dies (Cold Forming)	LOW CARBON Electrite Double Six M-2 Oil Hardening	C .68, Mn .25, Cr 4.15, W 6.40, Mo 5.00, V 1.90, Si .30	1950–2050	1800*	1550	1400–1500	2200–2250†	400–1200	Oil Mach. 60 Movement +A
Cold Work Dies (Cold Forming)	LOW CARBON ELECTRITE #1 Oil Hardening	C .58, Mn .25, Cr 4.10, W 18.00, V 1.13, Si .25	1900–2050	1750*	1600–1650	1550–1600	2350†	400–1100	Oil Mach. 55 Movement +A
Cold Work Dies (Cold Forming)	M CHROME Water Hardening	C 1.00, Mn .35, Cr 1.45, Si .25	1850–1900	1700*	1425–1450	1250	1475–1525†	350–550	Oil, Water Mach. 90 Movement —A
Cold Work Dies (Cold Forming)	RENOWN Water Hardening	C 1.00, Mn .25, V .20, Si .20	1750–1800	1600*	1425–1450	1250	1425–1500†	300–600	Water Mach. 100 Movement —B
Cold Work Dies (Cold Forming)	SPECIAL CARBON Water Hardening	C 1.01, Mn .25, Si .23	1750–1800	1600*	1425–1450	1250	1425–1500†	300–600	Water Mach. 100 Movement —B
Cold Work Dies (Cold Forming)	STAMINAL Oil Hardening	C .55, Mn .90, Cr .40, Mo .45, V .13, Si 1.00, Ni 2.70	1875–1975	1700*	1550 and 1125	1250	1600–1625†	350–1000	Oil, Air Mach. 45 Movement +A
Cold Work Dies (Cold Forming)	STANDARD CARBON Water Hardening	C 1.01, Mn .25, Si .23	1750–1800	1600*	1425–1450	1250	1425–1500†	300–600	Water Mach. 100 Movement —B
Cold Work Dies (Cold Forming)	WOLVA Water Hardening	C .80, Mn .35, Cr .15, W .85, Si .25	1850–1900	1700*	1425–1450	1250	1475–1550†	300–650	Water Mach. 95 Movement —A
Cold Work Dies (Blanking, Forming)	BADGER Oil Hardening	C .94, Mn 1.20, Cr .50, W .50, Si .30	1750–1800	1600*	1425–1450	1250	1475–1500†	350–400	Oil Mach. 90 Movement +A
Cold Work Dies (Blanking, Cold Forming)	G. S. N. Oil Hardening	C 2.20, Mn .50, Cr 13.40, Si .50	1850–1900	1700*	1600–1650	1200–1250	1700–1750†	300–550	Air, Oil Mach. 45 Movement +A
Cold Work Dies (Blanking, Forming)	MANGANO Oil Hardening	C .95, Mn 1.60, Cr .20, Si .35	1750–1800	1600*	1425–1450	1250	1425–1450†	350–400	Oil Mach. 90 Movement +A
Cold Work Dies (Blanking, Forming)	M. G. R. Air Hardening	C .55, Mn .30, Cr 5.00, W 1.20, Mo 1.20, Si .95	2000–2075	1850*	1650	1500	1825–1850†	500–1000	Air, Oil Mach. 85 Movement +A
Cold Work Dies (Blanking, Cold Forming)	SELECT B Air Hardening	C 1.00, Mn .70, Cr 5.25, Mo 1.10, V .30, Si .30	1950–2000	1800*	1550	1400	1725–1750†	300–1100	Air, Oil Mach. 70 Movement +A
Cutting Tools (Finishing)	ELECTRITE DOUBLE SIX M-2 Oil Hardening, High Speed	C .84, Mn .25, Cr 4.15, W 6.40, Mo 5.00, V 1.90, Si .30	1950–2050	1800*	1550	1400–1500	2200–2250†	1020–1080	Oil Mach. 55 Movement +A
Cutting Tools (Finishing)	ELECTRITE MV 1 Oil Hardening, High Speed	C .80, Mn .30, Cr 4.10, Mo 4.25, V 1.10, Si .25	1950–2050	1800	1525–1550	1400–1500	2075–2125	1000–1025	Oil Mach. 60 Movement +A
Cutting Tools (Finishing)	ELECTRITE MV 2 Oil Hardening, High Speed	C .88, Mn .30, Cr 4.10, Mo 4.25, V 1.82, Si .25	1950–2050	1800	1525–1550	1400–1500	2125–2175	1000–1025	Oil Mach. 55 Movement +A
Cutting Tools (Finishing)	ELECTRITE MV 3 Oil Hardening, High Speed	C 1.18, Mn .30, Cr 4.10, Mo 4.25, V 3.15, Si .25	1950–2050	1800	1525–1550	1400–1500	2225–2275	1000–1050	Oil Mach. 50 Movement +A
Cutting Tools (Finishing)	ELECTRITE MV 4 Oil Hardening, High Speed	C 1.40, Mn .30, Cr 4.10, Mo 4.25, V 4.15, Si .25	1950–2050	1800	1525–1550	1400–1500	2225–2275	1000–1025	Oil Mach. 45 Movement +A
Cutting Tools (Finishing)	ELECTRITE HV-6 Oil Hardening, High Speed	C 1.15, Mn .25, Cr 4.10, W 6.00, Mo 6.00, V 3.00, Si .25	1950–2050	1800*	1550	1400–1500	2200–2250†	1020–1080	Oil Mach. 50 Movement +A
Cutting Tools (Finishing)	ELECTRITE TATMO Oil Hardening, High Speed	C .80, Mn .25, Cr 4.00, W 1.70, Mo 8.75, V 1.15, Si .25	1900–1950	1700*	1525–1550	1400–1500	2175–2225†	1020–1080	Oil Mach. 55 Movement +A
Cutting Tools (Finishing)	ELECTRITE T.N.W. Oil Hardening, High Speed	C .87, Mn .25, Cr 4.00, Mo 8.00, V 1.90, Si .25	1900–2000	1800*	1525–1550	1400–1450	2175–2240†	1025–1075	Oil Mach. 55 Movement +A
Cutting Tools (Finishing)	ELECTRITE U Oil Hardening, High Speed	C .71, Mn .25, Cr 4.10, W 14.25, Mo .75, V 1.95, Si .25	1950–2050	1800*	1600–1650	1550–1600	2275–2325†	1050–1100	Oil Mach. 55 Movement +A
Cutting Tools (Finishing)	ELECTRITE VANADIUM Oil Hardening, High Speed	C 1.08, Mn .25, Cr 4.10, W 18.50, Mo .85, V 3.40, Si .25	1950–2050	1800*	1600–1650	1550–1600	2250–2300†	1020–1050	Oil Mach. 50 Movement +A

PRIMARY APPLICATION	TRADE NAME & TYPE	ANALYSIS (%)	SUGGESTED TEMPERATURE RANGES (°F)						Quenching Medium. ★ % Machinability Annealed. Movement in Hardening.	
			Forging	Finish Forging	Annealing	Preheating	Hardening	Tempering		
Cutting Tools (Finishing)	E. S. A. Water Hardening	C 1.40, Mn .25, Cr .50, W 4.00, V .30, Si .20	1850–1950	1700*	1550	1250	1475–1525†	200	Water Movement	Mach. 65 —A
Cutting Tools (Finishing)	W. T. Water Hardening	C 1.25, Mn .25, Cr .45, W 1.40, Mo .25, V .35, Si .30	1850–1950	1700*	1550	1300	1525–1575†	300–500	Oil, Water Movement	Mach. 85 +A
Cutting Tools (Finishing)	ELECTRITE #1 Oil Hardening, High Speed	C .75, Mn .25, Cr 4.10, W 18.00, V 1.13, Si .25	1900–2050	1750*	1600–1650	1550–1600	2250–2350†	1020–1080	Oil Movement	Mach. 55 +A
Cutting Tools (Finishing)	ELECTRITE #19 Oil Hardening, High Speed	C .85, Mn .25, Cr 4.10, W 18.50, Mo .60, V 2.20, Si .25	1900–2050	1750*	1600–1650	1550–1600	2300–2350†	1020–1080	Oil Movement	Mach. 50 +A
Cutting Tools (Roughing)	ELECTRITE COBALT Oil Hardening, High Speed	C .73, Mn .25, Cr 4.10, W 18.50, Mo .65, V 1.10, Co 5.00, Si .25	2000–2100	1800*	1650–1680	1550–1600	2325–2375†	1050–1100	Oil Movement	Mach. 50 +A
Cutting Tools (Roughing)	ELECTRITE CO-6 Oil Hardening, High Speed	C .88, Mn .25, Cr 4.10, W 6.00, Mo 5.25, V 1.90, Co 9.00, Si .30	1950–2050	1800*	1550	1400–1500	2220–2260†	1020–1080	Oil Movement	Mach. 45 +A
Cutting Tools (Roughing)	ELECTRITE LACOMO Oil Hardening, High Speed	C .81, Mn .30, Cr 4.10, W 1.70, Mo 8.30, V 1.25, Co 5.00, Si .30	1950–2050	1800*	1525–1550	1400–1450	2200–2240†	1025–1075	Oil Movement	Mach. 50 +A
Cutting Tools (Roughing)	MOTAP Water Hardening	C 1.20, Mn .85, Cr .50, Mo .60, Si .25	1850–1900	1700*	1450–1500	1250	1475–1525†	300–600	Oil, Water Movement	Mach. 95 —B
Cutting Tools (Roughing)	ELECTRITE SUPER COBALT Oil Hardening, High Speed	C .85, Mn .25, Cr 4.20, W 18.80, Mo .80, V 1.90, Co 9.10, Si .30	2000–2100	1800*	1650–1680	1550–1600	2325–2400†	1050–1100	Oil Movement	Mach. 45 +A
Cutting Tools (Roughing)	ELECTRITE SUPER COMO Oil Hardening, High Speed	C .80, Mn .25, Cr 4.15, W 1.55, Mo 8.30, V 1.25, Co 7.50, Si .30	1950–2050	1800*	1525–1550	1400–1450	2200–2240†	1025–1075	Oil Movement	Mach. 50 +A
Cutting Tools (Roughing)	ELECTRITE ULTRA COBALT Oil Hardening, High Speed	C .85, Mn .25, Cr 4.20, W 18.90, Mo .80, V 1.90, Co 12.00, Si .25	2000–2100	1800*	1650–1680	1550–1600	2350–2400†	1050–1100	Oil Movement	Mach. 40 +A
Cutting Tools (Roughing)	ELECTRITE UB Oil Hardening, High Speed	C .78, Mn .30, Cr 3.90, W 13.50, Mo .50, V 2.00, Co 4.75, Si .25	1950–2050	1800*	1600–1650	1550–1600	2350–2375†	1050–1100	Oil Movement	Mach. 50 +A
Cutting Tools (Roughing, Finishing)	RED ARROW 488 Cast Alloy	Cr 25-35, W 10-25, Co 40-60								
Cutting Tools (Roughing, Finishing)	RED ARROW 202 Cast Alloy	Cr 25-35, W 10-25, Co 40-60								
Cutting Tools (Roughing, Finishing)	RED ARROW 222 Cast Alloy	Cr 25-35, W 10-25, Co 40-60								
Cutting Tools (Roughing, Finishing)	RED ARROW 303 Cast Alloy	Cr 25-35, W 10-25, Co 40-60								
Cutting Tools (Roughing, Finishing)	RED ARROW 333 Cast Alloy	Cr 25-35, W 10-25, Co 40-60								
Die Casting Dies	ALDIVAN Oil Hardening	C .45, Mn .65, Cr 2.50, V .25, Si .25	1900	1700	1550	1200–1300	1625–1650	700–800	Oil Movement	Mach. 90 +A
Die Casting Dies	DYCAST NO. 1 Air Hardening	C .40, Mn .30, Cr 5.40, Mo .90, V .50, Si 1.00	1950–2050	1800	1550–1650	1200–1300	1800–1850	1100–1150	Air Movement	Mach. 65 +A
Die Casting Dies	LUMDIE Air Hardening	C .40, Mn .25, Cr 5.25, W 4.65, Si 1.00	1950–2050	1750	1650	1250	1850	1050–1100	Air Movement	Mach. 65 +A
Die Casting Dies	V.D.C. Air Hardening	C .40, Mn .30, Cr 5.40, Mo 1.20, V 1.00, Si 1.00	2050–2100	1800	1550	1250	1850	1050–1125	Air Movement	Mach. 70 +A
Die Casting Dies	Z.T.M. Oil Hardening	C .35, Mn .80, Cr .85, Mo .30, Si .55	2000–2100	1800	1550	1300	1650–1700	600–800	Oil Movement	Mach. 90 +A
Hot Work Dies (Hot Forming)	C.L.W. Oil Hardening	C .30, Mn .25, Cr 3.30, W 9.15, V .50, Si .45	1900–2050	1750	1600–1650	1550–1600	2100–2150	1050–1200	Oil Movement	Mach. 70 +B
Hot Work Dies (Hot Forming)	E.H.W. NO. 1 Oil Hardening	C .25, Mn .25, Cr 4.10, W 15.10, V .50, Si .25	1950–2100	1850	1600–1650	1550–1600	2200–2250	1050–1200	Oil Movement	Mach. 65 +A
Hot Work Dies (Hot Forming)	KALKOS Oil Hardening	C .30, Mn .35, Cr 12.00, W 12.00, V .90, Si .50	2000–2100	1800	1600–1650	1400–1500	2100–2250	950–1300	Air, Oil Movement	Mach. 50 +A
Hot Work Dies (Hot Forming)	L.P.D. Air Hardening	C .35, Mn .30, Cr 5.00, W 1.35, Mo 1.65, Si 1.00	1950–2050	1800	1550–1650	1400–1500	1850–1900	1050–1100	Air, Oil Movement	Mach. 70 +A
Hot Work Dies (Hot Forming)	SELECT M Air Hardening	C .93, Mn .35, Cr 3.50, Mo .60, V .20, Si .25	1900–1950	1750	1550	1400	1650–1750	300–1050	Air, Oil Movement	Mach. 75 +B
Hot Work Dies (Hot Punching, Hot Shearing)	C.H.W. Oil Hardening	C .50, Mn .30, Cr 2.80, W 15.10, V .50, Si .25	1900–2050	1750	1600–1650	1550–1600	2200–2250	1050–1200	Oil Movement	Mach. 60 +A
Permanent Magnets	37% COBALT MAGNET Oil Hardening	C .90, Mn .30, Cr 4.25, W 2.25, Co 38.00, Si .25	1950–2000	1750	1625–1350	1200–1250	1750–±5° F	212 ...	Oil Movement	Mach. 30 +A
Plastic Molding Dies (Machine Cut Cavity Dies)	CASCADE Oil Hardening	C .13, Mn .25, Cr .12, Si .25, Ni 4.00, Al 1.60	2050–2100	1850	1550	1200–1300	1625–1650	1350 then age at 950	Oil Movement	Mach. 90 +A
Shock Resisting (Intermittent Impact)	CROWN Oil Hardening	C .50, Mn .80, Cr .95, V .20, Si .25	1800–1900	1700*	1525–1550	1200–1300	1625–1675†	450–1175	Oil Movement	Mach. 75 —B
Shock Resisting (Intermittent Impact)	SUPERB Oil Hardening	C .75, Mn .25, Cr .95, V .18, Si .20	1750–1800	1600*	1550	1250	1550–1600†	300–1100	Water, Oil Movement	Mach. 90 +A
Shock Resisting (Repeated Impact)	DAMASCUS Water, Oil Hardening	C .56, Mn .90, Cr .25, V .30, Si 2.05	1800–1900	1700*	1425–1450	1200–1300	1625–1675†	300–800	Water, Oil Movement	Mach. 85 +C



MESTA
Heavy Duty
ROLL GRINDERS

Mesta Roll Grinders of simplified design are the most accurate and dependable grinding machines available today. Built with precision for the finest finishing and with ruggedness for the heaviest roughing.

Mesta 28" Traveling Table Type Roll Grinder

DESIGNERS AND BUILDERS OF COMPLETE STEEL PLANTS

MESTA MACHINE COMPANY · PITTSBURGH, PA.

PRIMARY APPLICATION	TRADE NAME & TYPE	ANALYSIS (%)	SUGGESTED TEMPERATURE RANGES (°F)						Quenching Medium. ★ % Machinability Annealed. Movement in Hardening.		
			Forging	Finish Forging	Annealing	Preheating	Hardening	Tempering			
Shock Resisting (Repeated Impact)	LANARK Oil Hardening	C .55, Mn .90, Cr .20, Mo 1.25, V .25, Si 1.90	1850–1950	1700*	1500–1550	1300	1650–1700†	300–1200	Water, Oil Movement	Mach. 85 +B	
Shock Resisting (Repeated Impact)	N. D. S. Oil Hardening	C .75, Mn .30, Cr 1.00, Si .25, Ni 1.70	1800–1850	1600*	1450	1250	1525–1550†	250–800	Oil Movement	Mach. 60 +A	
Shock Resisting (Repeated Impact)	TRIDENT Oil Hardening	C .58, Mn .30, Cr .60, Mo .35, V .25, Si .70	1850–1950	1700*	1450–1500	1250	1600–1650†	300–1000	Water, Oil Movement	Mach. 90 +B	
Shock Resisting (Repeated Impact)	X.L. CHISEL Oil Hardening	C .55, Mn .25, Cr 1.35, W 2.00, V .25, Si .25	1900–2050	1750*	1550	1300	1700–1750†	300–1200	Oil Movement	Mach. 85 +B	
Thermostat Parts	INVAR	C .13, Mn .80, Si .25, Ni 38.00	....	....	....	....	....	....	... Movement	Mach. 40 O	

* Minimum forging temperature. † 25-50° F lower if salt bath hardened.

P. F. McDONALD & CO., 17 King Terminal, Boston 27, Mass. — Listing No. 33

Cold Work Dies (Blanking, Punching, Cold Forming)	MACCO KROMAX 1 Air Hardening	C 1.50, Mn .35, Cr 11.90, Mo .90, V .28, Si .23	1900	1700	1650	1250	1850	450	Air, Oil Movement	Mach. 60 A
Cold Work Dies (Blanking, Punching, Cold Forming)	MACCO KROMAX 2 Air Hardening	C 1.40, Mn .32, Cr 12.50, Mo .85, Co 3.25, Si .42	2000	1750	1650	1250	1850	925	Air Movement	Mach. 60 A
Cold Work Dies (Cold Heading)	MACCO B-29 Water Hardening	C .98, Mn .26, V .20, Si .20	1800	1600	1450	1200	1450	425	Water Movement	Mach. 70 B
Cold Work Punches, Dies (all kinds)	MACCO 35 AIR HARD Air Hardening	C 1.00, Mn .60, Cr 5.25, Mo 1.15, V .25, Si .25	1950	1800	1550	1400	1800	450	Air Movement	Mach. 65 A
Cold Work Punches, Dies (all kinds)	MACCO ROYAL CROWN Oil Hardening	C .90, Mn 1.20, Cr .50, W .50, V .25, Si .30	1850	1650	1450	1200	1490	400	Oil Movement	Mach. 70 A
Cold Work Punches, Dies (all kinds)	MACCO SPECIAL Water Hardening	C 1.01, Mn .20, Si .16	1800	1600	1450	1200	1425	475	Water Movement	Mach. 70 B
Cutting Tools	MACCO ENORMOUS High Speed	C .83, Mn .25, Cr 4.50, W 22.00, Mo 1.00, V 2.00, Co 10.00, Si .27	2100	1800	1680	1600	2425	1080	Oil Movement	Mach. 60 B
Cutting Tools	MACCO RADIO High Speed	C .84, Mn .25, Cr 4.00, W 6.50, Mo 5.00, V 1.90, Si .26	2050	1750	1550	1500	2250	1050	Oil Movement	Mach. 65 A
Cutting Tools	MACCO SUPERIOR High Speed	C .75, Mn .28, Cr 4.00, W 18.00, V 1.00, Si .22	2100	1750	1650	1600	2300	1050	Oil Movement	Mach. 60 A
Cutting Tools	MACCO SUPER MOLY High Speed	C .80, Mn .25, Cr 3.90, W 1.70, Mo 8.80, V 1.10, Si .24	1950	1700	1550	1500	2225	1050	Oil Movement	Mach. 65 B
Die Casting Lens Molds	MACCO LENS MOULD High Speed	C .40, Mn .25, Cr 5.25, W 4.65, Si 1.00	2000	1800	1650	1400	1850	1050	Air, Oil Movement	Mach. 70 A
Die Casting (Magnesium, Aluminum)	MACCO 33 Air Hardening	C .40, Mn .30, Cr 5.50, Mo 1.40, V 1.00, Si 1.00	2100	1750	1550	1400	1850	1075	Air Movement	Mach. 70 A
Die Casting (Zinc)	MACCO 99 Oil Hardening	C .35, Mn .80, Cr .85, Mo .35, Si .60	2050	1850	1550	1400	1675	625	Oil Movement	Mach. 70 B
Hot Work Dies	MACCO M L Air Hardening	C .35, Mn .30, Cr 5.00, W 1.50, Mo 1.65, Si 1.00	2000	1750	1650	1500	2100	1050	Air Movement	Mach. 70 A
Hot Work Dies	MACCO P-125 High Speed	C .25, Mn .28, Cr 4.20, W 15.50, V .50, Si .27	2050	1850	1650	1600	2250	1100	Oil Movement	Mach. 65 A
Hot Work Dies	MACCO P-150 High Speed	C .51, Mn .29, Cr 2.90, W 15.30, V .60, Si .25	2050	1750	1650	1600	2250	1100	Oil Movement	Mach. 65 A
Hot Work Dies	MACCO P-175 High Speed	C .31, Mn .29, Cr 3.30, W 9.50, V .50, Si .43	2050	1750	1650	1600	2150	1100	Oil Movement	Mach. 65 A
Impact Tools, Chisels, Shear Blades	MACCO FOOLPROOF	C .55, Mn .25, Cr 1.40, W 2.40, V .30, Si .25	2000	1600	1550	1300	1750	400	Oil Movement	Mach. 75 B
Plastic Molding Dies (Hubs)	MACCO HARDTUF Oil Hardening	C .50, Mn .30, Cr 1.60, W 2.60, V .25, Si .60	1950	1600	1500	1250	1700	425	Oil Movement	Mach. 75 B
Plastic Molding Dies (Hubs)	MACCO HOBOMOLD Water, Oil Hardening	C .04, Mn .20, Si .16	2000	1600	1700	....	carburize	275	Oil, Water Movement	Mach. 100 B
Plastic Molding Dies (Machined)	MACCO N L S Air Hardening	C .90, Mn .60, Cr 5.20, Mo 1.20, V .30, Si .25	1950	1800	1550	1400	1800	450	Air Movement	Mach. 70 A
Punching, Shearing	MACCO FOOL PROOF Oil Hardening	C .55, Mn .25, Cr 1.40, W 2.40, V .30, Si .25	2000	1600	1550	1300	1750	400	Oil Movement	Mach. 75 B
Shock Resisting (Intermittent Impact, Chisels)	MACCO SIL. MANG. Oil Hardening	C .63, Mn .78, Si 2.00	1900	1600	1425	1300	1600	450	Oil Movement	Mach. 75 B
Shock Resisting (Repeated Impact, Chisels)	MACCO FOOL PROOF	(Listed Above)								
Tools, Dies, Sleeves	MACCO HOLLOW BAR TUBING	C 1.05, Mn .30, Cr 1.05	1900	1650	1500	....	1550	450	Oil Movement	Mach. 70 A

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The Modern Electric Resistance Welded Steel Tubing

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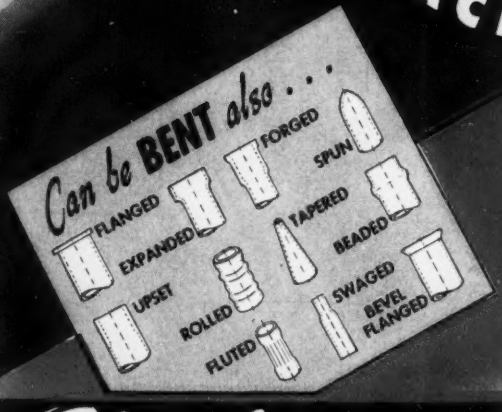
SQUARE

½" to 2" 20 gauge —1" to 2¾" 14, 16, 18 gauge

RECTANGULAR

½" to 2" 20 gauge—1" to 2¾" 14, 16, 18 gauge



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PRIMARY APPLICATION	TRADE NAME & TYPE	ANALYSIS (%)	SUGGESTED TEMPERATURE RANGES (°F) Forging	Finish Forging	Annealing	Preheating	Hardening	Tempering	Quenching Medium. ★ % Machinability Annealed. Movement in Hardening.
A. MILNE & CO., 745 Washington St., New York, N. Y.									**Listing No. 34**
Cold Work Dies (Blanking, Forming)	AMC Oil, Air Hardening, High Speed	Cr 4.00, W 18.00, V 1.00	1750–2050	....	1600–1650	1500–1600	2250–2350	1050–1200	Oil, Hot Salt, Air Mach. Movement A 55
Cold Work Dies (Blanking, Forming)	AMCOH Standard Oil Hardening	C .95, Mn 1.25, Cr .50, W .50	1650–1950	....	1425–1450	1200	1425–1475	300–1000	Oil Mach. 80 Movement A
Cold Work Dies (Blanking, Forming)	DOUBLE SEVEN Air Hardening	C 1.35, Cr 12.50, Mo .60, Co 3.00	1750–2000	....	1625–1650	1250	1825–1850	300–1200	Air, Oil Mach. 45 Movement A
Cold Work Dies (Blanking, Forming)	DOUBLE SIX Air Hardening	C 2.25, Cr 13.00	1700–1900	....	1600–1650	1250	1750–1800	300–1200	Oil, Air Mach. 45 Movement A
Cold Work Dies (Blanking, Forming)	GRAPH-MO§ Oil Hardening	C 1.50, Mn .50 Max., Mo .25 Avg., Si .80 Avg.	1500–1950	....	1480	1200	1450–1550	300–1000	Oil Mach. 160 Movement A
Cold Work Dies (Blanking, Forming)	HIGH PRODUCTION Air Hardening	C 1.55, Cr 11.50, Mo .75, V 1.00	1700–1900	....	1600–1650	1250	1800–1850	300–1200	Air, Oil Mach. 60 Movement A
Cold Work Dies (Blanking, Forming)	ORANGE LABEL Water Hardening	C 1.00-1.10	1600–1800	....	1425	1200	1425–1500	300–800	Water Mach. 100 Movement C
Cold Work Dies (Blanking, Forming)	GRAPH-TUNG§ Water Hardening	C 1.50, Mn .40 Max., W 2.80 Avg., Mo .50, Si .60-.70	1500–1900	....	1430	1200	1450–1500	300–1000	Water Mach. 100 Movement C
Cutting Tools (Finishing)	AMC (Listed Above)								
Cutting Tools (Finishing)	MILVAN Oil, Air Hardening, High Speed	Cr 4.25, W 19.00, V 2.25	1750–2050	....	1600–1650	1550–1600	2300–2375	1050	Oil, Hot Salt, Air Mach. Movement A 55
Cutting Tools (Finishing)	MM6&6 Oil, Air Hardening, High Speed	C .85, Cr 4.15, W 6.40, Mo 5.00, V 1.90	1750–2050	....	1550	1400–1500	2230–2280	1050	Oil, Hot Salt Mach. 60 Movement A
Cutting Tools (Roughing)	HYCO Oil, Air Hardening, High Speed	Cr 4.25, W 18.50, V 1.30, Co 5.00	1800–2100	....	1600–1650	1550–1600	2350–2400	1050	Oil, Hot Salt, Air Mach. Movement A 50
Cutting Tools (Roughing)	MAJOR Oil, Air Hardening, High Speed	Cr 4.00-5.00, W 21.00-22.00, Mo .50, V 1.50, Co 13.00	1800–2100	....	1600–1650	1550–1600	2375–2475	1075	Oil, Hot Salt, Air Mach. Movement A 45
Cutting Tools (Roughing)	(See AMC, MILVAN, MM6&6, Listed Above)								
Die Casting Dies	AO20 Water, Oil Hardening	C .50, Cr 1.50, W 2.25, V .25	1650–2000	....	1450–1500	1250	1750–1650	300–1000	Oil, Water Mach. 70 Movement B
Die Casting Dies	CMW Air Hardening	C .35, Cr 5.00, W 1.30, Mo 1.75, Si 1.00	1700–2050	....	1550–1650	1400	1850–2100	900–1200	Oil, Air Mach. 80 Movement A
Gages	(See AMCOH, GRAPH-MO, GRAPH-TUNG, HIGH PRODUCTION, Listed Above)								
High Stress, High Wear, Machinery Parts	(See GRAPH-MO, GRAPH-TUNG, MSM, Listed Above)								
Hot Work Dies (Hot Forming)	(See AMC, AO20, CMW, Listed Above)								
Hot Work Dies (Hot Forming)	3074 HOT WORK Oil, Air Hardening	C .35, Cr 4.00, W 8.00-10.00, V .50	1700–2100	....	1600–1650	1500	2100–2200	1050–1300	Oil, Air Mach. 55 Movement A
Hot Work Dies (Hot Punching, Hot Shearing)	(See AMC, AO20, CMW, 3074 HOT WORK, Listed Above)								
Plastic Molding Dies (Ejector Pins)	MSM Water, Oil Hardening	C .55, Mn .80, Mo .50, V .25, Si 2.00	1650–1950	....	1425–1475	1200	1650–1550	300–800	Oil, Water Mach. 80 Movement B
Plastic Molding Dies (Ejector Pins)	AO20 (Listed Above)								
Plastic Molding Dies (Hubs)	(See AMCOH, AO20, GRAPH-MO, HIGH PRODUCTION, MSM, Listed Above)								
Plastic Molding Dies (Machine Cavities)	(See AMCOH, GRAPH-MO, Listed Above)								
Punching and Shearing	GRAPH-AL§ Water Hardening	C 1.50, Mn .30 Max., Si .15-.25, Ni Al .12-.20	1500–1925	....	1380	1200	1450–1500	400–1000	Water Mach. 160 Movement C
Punching and Shearing	(See AMC, AMCOH, AO20, DOUBLE SEVEN, GRAPH-MO, HIGH PRODUCTION, MSM, ORANGE LABEL, Listed Above)								
Shock Resisting (Repeated, Intermittent Impact)	(See AO20, GRAPH-AL, GRAPH-TUNG, MSM, ORANGE LABEL, Listed Above)								

§ Made by Timken Roller Bearing Co.

METAL CARBIDES CORP., 107 E. Indianola Ave., Youngstown 5, O. — **Listing No. 35**

Cold Work Dies (Blanking)	TALIDE C-7525, Carbide	C 6.0, W 69.0, Co 25.0
Cold Work Dies (Cold Forming)	TALIDE C-88, Carbide	C 6.0, W 82.0, Co 12.0
Cutting Tools (Finishing)	TALIDE C-91, Carbide	C 6.0, W 86.0, Co 8.0
Cutting Tools (Finishing)	TALIDE C-93, Carbide	C 6.0, W 88.0, Co 6.0
Cutting Tools (Finishing)	TALIDE S-90, Carbide	C 6.0, W 86.0, Co 8.0 (Also contains titanium carbide)
Cutting Tools (Finishing)	TALIDE S-92, Carbide	C 6.0, W 88.0, Co 6.0 (Also contains titanium carbide)
Cutting Tools (Roughing)	TALIDE C-89, Carbide	C 6.0, W 84.0, Co 10.0
Cutting Tools (Roughing)	TALIDE S-88, Carbide	C 6.0, W 84.0, Co 10.0 (Also contains titanium carbide)
Punching, Shearing	TALIDE C-8020, Carbide	C 6.0, W 74.0, Co 20.0
Shock Resisting (Intermittent Impact)	TALIDE C-8515, Carbide	C 6.0, W 79.0, Co 15.0
Shock Resisting (Repeated Impact)	TALIDE C-8020, Carbide	C 6.0, W 74.0, Co 20.0

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Allegheny Metal is the steel that has made a name for itself in the tool and die field. Its reputation is based on the fact that it has helped thousands of tool users to get more and better work out of their tools. Allegheny Metal is the steel that has made a name for itself in the tool and die field. Its reputation is based on the fact that it has helped thousands of tool users to get more and better work out of their tools.

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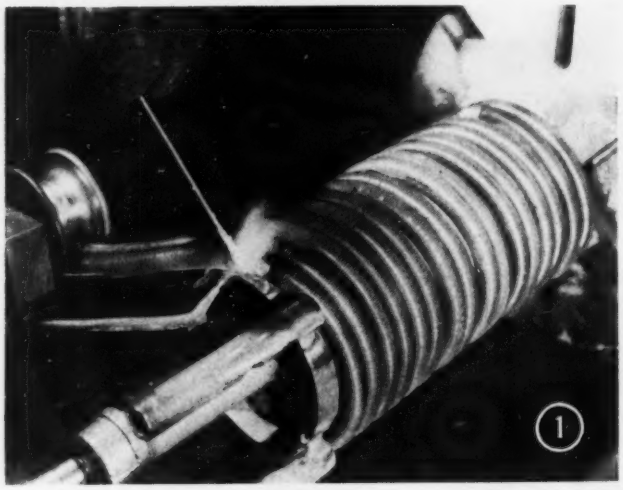


Fig. 1—*Tubing being tacked at end of winding operation on a Freon shell and coil condenser*

PRODUCTION GAS JOINING

Air Conditioning and Refrigeration Parts

Character of materials—piping, tubing, coils—is such that closure, jointing, mounting and other major operations are efficiently accomplished by applications of oxyacetylene welding and low-temperature brazing

By WARD SWARTHOUT
Process Engineer
Acme Industries Inc.
Jackson, Mich.

ONLY in the last 50 years have men learned how to devise methods of refrigeration and air conditioning adequate to develop extremely low temperatures and to maintain them under controlled conditions over a constant period. Rapidly growing demand for equipment of this type to implement modern industrial processes has led to the development of a wide range of refrigeration and air conditioning methods, and many types of devices.

However diverse their design, all rely upon the fundamentals of heat exchange principles. Transfer of heat from a warm stream, either gaseous or liquid, to a countercurrent cold stream, and the repetition of this exchange to reach the desired temperature levels, is a necessary fundamental in every refrigeration and air conditioning system.

Devices for performing this exchange vary greatly in design, according to the intended use and the temperature levels required. But all such devices entail more or less intricate structures of tubing, piping, or coils, many of them encased in shells to permit countercurrent flows under controlled conditions.

Such structures involve innumerable fittings, closures and joints to which welding, brazing, soldering and cutting are indispensable fabrication processes. Welding and cutting are the primary operations in producing the shells for housing such units and in adding the external connections. A further complication inherent to the internal design of heat

Fig. 2—*Connecting tubes being fitted and tack-welded between a finned coil assembly and its header connection. One-sixteenth inch steel rod is used at a temperature close to* 2500° *F*

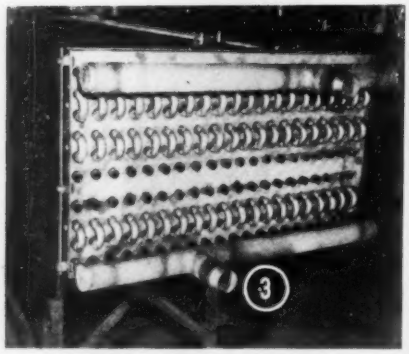
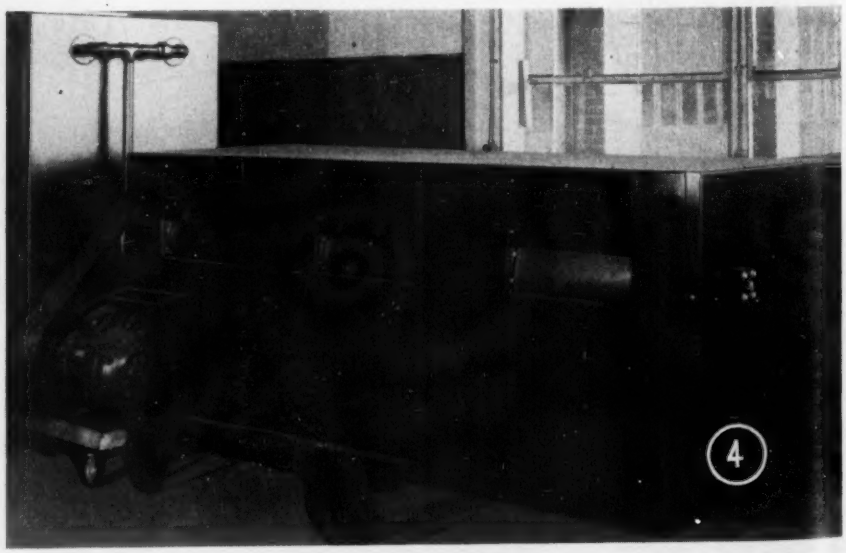


Fig. 3—*One end of a partially completed industrial cooling unit. Return bends of the finned coils, and two headers are already welded in place. Open-end tubes extend through the end stanchion to provide for two additional headers yet to be assembled*

Fig. 4—*Upper, or fan section of a large evaporative condenser*



transfer units is the requirement for a maximum area of contact between the stream in the tubes, pipes or coils, and the stream flowing countercurrent between them and the outer shell. Of many methods for achieving the maximum area of contact in as small and compact a unit as possible, a common one involves the use of fins or other types of heat conducting devices, the arrangement of which is also best adapted to oxyacetylene processes.

Applications—An account of all oxyacetylene applications to production methods in the air conditioning and refrigeration industry would run the gamut of oxyacetylene usages. Those here described are typical of the more interesting applications uniquely suited to production requirements of this industry.

Heat pumps constitute one of the newer developments in the air conditioning field to the fabrication of which oxyacetylene methods are especially suited. They are designed to provide a transfer of heat from the earth to the surface during winter, and cold from the earth to the surface during summer, as a means of heating and cooling houses.

A Freon shell and coil condenser forms the basic design of the heat pump. For its fabrication, a hollow drum support is fitted into a jig. Two strands of copper tubing, finned to provide larger contact surface, are silver-soldered to the header connection at the end of the drum. For this operation, Easy-Flo Number 35 brazing alloy which melts at about 1175° F is used.

When this joining is completed, the drum is slowly revolved on the jig to wind the tubing about the drum. At the beginning and at the end, Fig. 1, of this coiling operation, the tube is tacked to the surface of the drum. A brazing rod and Marvel flux are used at a temperature of 1600 to 1800° F. With the coiling operation completed, the remaining ends of the two strands of tubing are silver-soldered to the header at the other end of the drum.

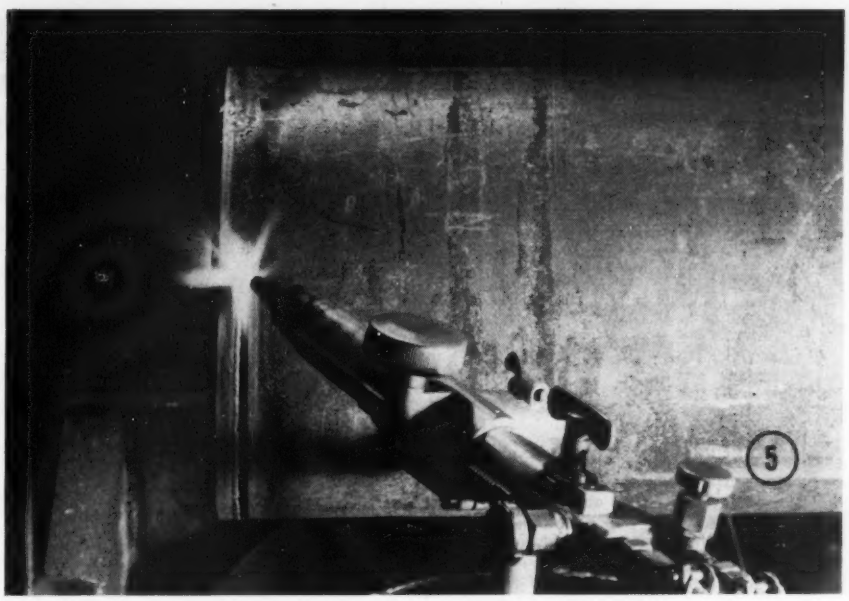


Fig. 5—Automatic oxyacetylene cutting torch in process of simultaneously cutting and bevelling a 20-inch pipe to provide shells for condensers. Torch remains fixed, while the pipe revolves at a controlled rate. Torch is attached to the jig by a movable standard

Metal Straps Applied—Metal straps must then be applied lengthwise of the coil to provide a support for the outside coil of the condenser. This mounting is done by brazing each strap to the coil at four points. Brazing rod and Marvel flux are used at temperatures of 1600 to 1800° F. The unit is then ready for winding and fitting of the outer coil, which is made of the same material and applied in a similar manner. The entire assembly is then ready for mounting within the shell.

Oxyacetylene plays a major role in the fabrication of industrial cooling equipment of all types. One such unit is shown in Fig. 2, with short tube lengths being fitted and tack-welded into the header with 1/16-inch steel rod at a temperature close to 2500° F. These joining tubes provide a connection between the header and the finned coils. They are inserted into holes in the header, tack-welded, fitted while hot to form a butt joint with the open ends of the coil tubes, then welded at both ends.

One end of this unit is shown in Fig. 3 to illustrate the important part gas welding plays in its manufacture. On this piece of equipment, return bends of the finned coils and two headers have already been welded in place. Open-end tubes extend through the end stanchion to provide for two additional headers yet to be assembled.

Evaporative Condenser Coils—In the final stage of assembly on evaporative condenser coils, tension rods are run through between the tubes, and bolted together. After bolt ends and nuts are trimmed with an oxyacetylene cutting torch, surface of the outer rod is ground smooth. The finished pipe coil of the evaporative condenser is galvanized and then fitted into place with header outlets extending through the casing. Fig. 4 shows the upper, or fan, section of

(*Please turn to Page* 148)

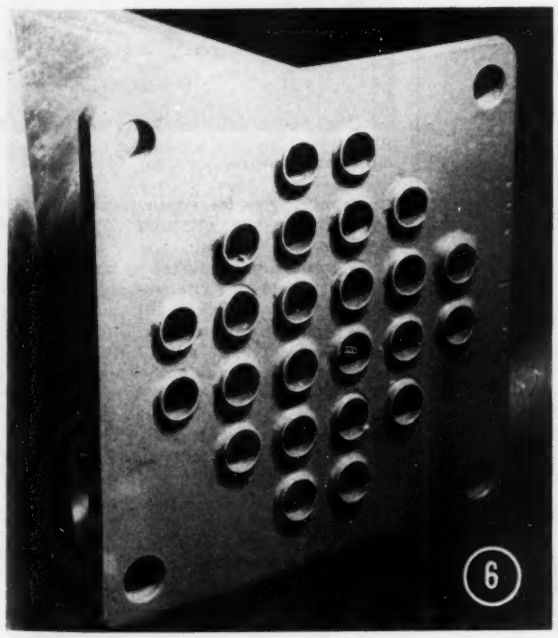


Fig. 6 — Finished tube sheet end of condenser. Tubes have been silver-soldered in place, and the face of the sheet treated with Heresite, a rust and corrosion-proof material

COPPER ALLOY BULLETIN

REPORTING NEWS AND TECHNICAL DEVELOPMENTS OF COPPER AND COPPER-BASE ALLOYS

Prepared Each Month by Bridgeport Brass Co. "Bridgeport" BRASS CO. *Headquarters for BRASS, BRONZE and COPPER*

Colorful Copper-Base Alloys Serve Many Decorative Uses

No other metals in their natural state have such a wide range of beautiful colors as Copper and its alloys. Beginning with the characteristic red of copper, alloying this metal with zinc, tin, aluminum, silicon, or nickel develops various shades of bronze, gold, yellow and silver. Hence their popular use for decorative articles.

In most cases the desired color effect is obtained by selecting the correct copper-base metal and then suitably cleaning, polishing, or scratch brushing it. Its gleaming finish is then protected by applying a clear lacquer coating after proper cleaning. Variety of finish is also obtained by stamping designs which are filled in with colorful enamels or paints.

Wide Range of Colors to Choose From

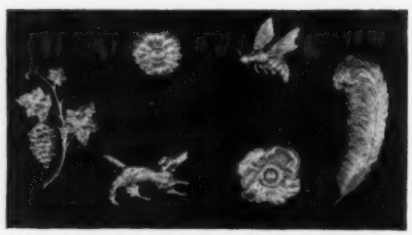
Copper is the most commonly used metal for decorative purposes, both for its natural rich, warm color and its exceptionally fine workability. Copper is used for everyday articles such as gift items, trays, creamers, sugars, tobacco humidors, flower pots, sprinklers, table and floor lamps, vases, tea kettles, cooking utensils, porch lighting fixtures and post lanterns, ash trays, etc. Many copper articles are finished in statuary bronze, black, patina blue or green to imitate effects of time and weathering.

Copper is also the base for similar items that are finished plated with nickel, chromium, or silver, or plated color effects such as red, blue, green, yellow, etc. High quality has long been associated with copper as a base for silver plate. Fine examples of Sheffield ware made over a hundred years ago are frequently found among collections of antique silver.

Effect of Alloying

Gilding Metal containing 95% copper and 5% zinc is very close to copper in color but is somewhat stronger and harder than the latter. It is popular for costume jewelry, coins, plaques, and escutcheons where the natural color of the metal is valued for its decorative effects. Manufacturers using vitreous enamel decorative effects also favor this alloy because the high temperatures necessary for fusing the enamel powder have a less softening effect on it than on copper.

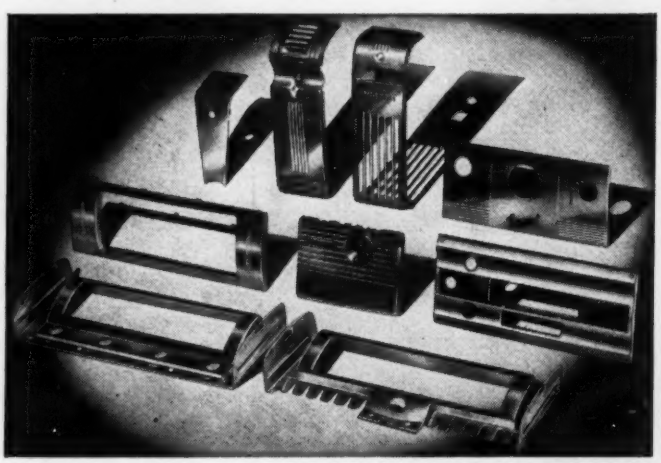
When it is necessary to match the color of cast bronze, brass containing 90% copper and 10% zinc, known to the trade as Commercial Bronze, is used. This alloy is also very ductile and is resistant to season cracking when used for outdoor construction. For this reason it is used widely for outdoor electric light fixtures. Although Commercial Bronze has been used for many years for the manufacture of screws for fastenings in outdoor construction, Silicon Bronzes such as Bridgeport's No. 609 is being used more and more for engineering requirements where dependable, high strength is essential.



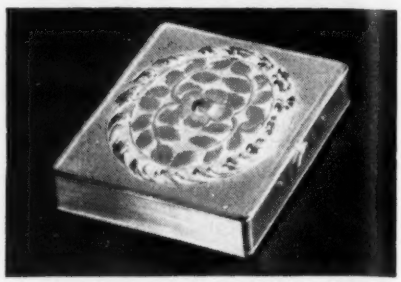
Attractive costume jewelry calls for artistic designs and excellent die work. Courtesy Augat Brothers, Attleboro, Mass.

An alloy which is quite popular for costume jewelry is Bridgeport's Jewelry Bronze No. 92. This contains approximately 89% copper, 1.9% tin and remainder zinc. It is similar to Commercial Bronze in color and resembles red gold when in its clean polished condition.

The rich golden color of 14 karat gold can be closely matched with Bridgeport's No. 87 alloy which contains about 88% copper and 12% zinc and Rich Low Brass containing 85% copper and 15% zinc. These alloys are very popular for making attractive, but inexpensive, vanity cases, lipstick holders, bottle caps, coins, plaques, escutcheons, watch and clock dials and etched plates.



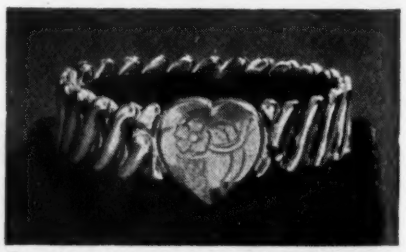
Decorative escutcheons and trim combine skilled metal craftsmanship with beautiful unique finishes—Courtesy L. F. Grammes & Sons, Inc., Allentown, Pa.



Lovely vanities in brass and nickel silver vie with gold in appeal. Courtesy Bliss Brothers Company, Attleboro, Mass.

Low Brass containing 80% copper and 20% zinc has a pale gold color. Cartridge Brass (Copper 70%, Zinc 30%) and High Brass (Copper 66%, Zinc 34%) have the characteristic yellow brass color. The gleaming bright yellow color of brass has always been a favorite with decorators for the manufacture of table and floor lamps, gift items, builders' hardware, door knockers, candlestick holders, fireplace accessories, etc. Illustration shows bezels, escutcheons and name plates made by L. F. Grammes & Sons, Inc., representing a few of the decorative parts which enhance the appeal of radios, electric stoves, refrigerators, etc.

Bridgeport's Duronze III (silicon aluminum bronze) which contains about 91% copper, 7% aluminum and 2% silicon, has a pale brass color. In its clean brushed condition this unusual color is very decorative. However this alloy finds its greatest use for engineering purposes where great strength and corrosion resistance are essential.



Brass is the basis for this beautiful, flexible bracelet. Courtesy J. M. Hall Company, Providence, R. I.

The addition of nickel to brass in substantial quantities changes the yellow to a silver color. Nickel Silver containing 18% nickel is very popular for the highest grades of silver plated flatware, trays, pitchers, sugars, candlesticks, tobacco humidors, ashtrays and gift items. At points where the wear is greatest and the silver plate is worn away, the white color of nickel silver is revealed which matches the color of silver quite closely. Good grade silver plated ware presents an attractive appearance after many years of service.

The physical characteristics of copper and copper-base alloys used for fabricating purposes are described in greater detail in Bridgeport's Technical Handbook.

CAUSES OF CORROSION

This article is one of a series of discussions by C. L. Bulow, Research Chemist of the Bridgeport Brass Company.

GALVANIC CORROSION IN FRESH WATER

Dangerous Galvanic Couples

Instances are on record where steel plugs screwed into copper or other nonferrous alloy hot water storage tanks corroded through in very short periods of time. This combination of a large cathodic area (copper, nickel-copper alloy, etc.) coupled with a small anodic area (steel or cast iron) definitely is bad practice and obviously can be avoided through the use of brass or bronze plugs. Similar instances of difficulty have been encountered where steel couplings or unions have been inserted in brass or copper pipe lines.

Protective Galvanic Couples

In some fresh waters, the corrosion of aluminum, steel, zinc and magnesium may be increased considerably when coupled with copper or copper-base alloys. In these waters, the magnesium/copper galvanic couple is very active. In recent years, a number of investigators have turned their attention to the possibilities of magnesium as a galvanic anode for the protection of metallic equipment exposed to fresh water and aqueous solutions.

Corrosion Inhibitors

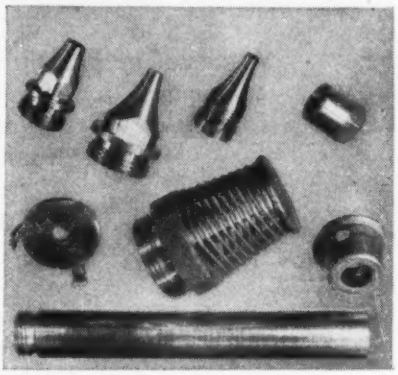
In the bimetallic systems found in automobile radiators, corrosion has been considerably reduced through the addition of sodium chromate to the fresh water used for cooling purposes. The soluble oil type of corrosion inhibitor also has been widely used in proprietory anti-freeze preparations. The main objection to the use of oils is that if used in too high a concentration, they may have an injurious action on rubber parts of the cooling system.

In diesel and gas engine cooling systems, protection has been obtained through the use of 500 to 1,000 parts per million of chromate[1,2]. In order to prevent the formation of mineral scales, a combination of polyphosphates with organic corrosion inhibitors or chromates has also been used[3].

In hydraulic systems (presses, elevators, etc.) 100 to 200 parts per million of chromate have been reported as giving satisfactory results[4]. Soluble oils have also been used to some extent in such systems.

(1) Marc Darrin, *Ind. and Eng Chem.*, Anal Ed. 13, 755-759 (1941).
(2) Marc Darrin, *Ind. and Eng. Chem.*, 37, 741-749 (1945).
(3) H. H. Uhlig, *Corrosion Handbook*, pp 499-500, John Wiley and Sons, Inc. (1948)
(4) R. C. Ulmer and J. M. Decker, *Combustion*, 10, 31-32 (1928).

LEADED NAVAL BRASS ROD FOR WELL PUMP PARTS



Parts of Jacuzzi injector pumps made from Bridgeport's Leaded Naval Brass – Courtesy Jacuzzi Brothers, Inc., Richmond, Calif.

Since well pumps are expected to operate continuously and give long, uninterrupted service, much attention is given to the use of materials which will resist corrosive attack and erosion from well water. Naval Brass containing about 61% copper, 0.65% tin, balance zinc, has been found to resist this type of corrosion satisfactorily in most sections of the country.

Since many of the parts in pump construction require considerable machining, Bridgeport No. 29 Leaded Naval Brass is used. This alloy contains approximately 60% copper, 0.65% tin, 1.75% lead, balance zinc and combines the good corrosion-resisting properties of Naval Brass with the free machinability of ordinary leaded brass.

The parts illustrated are used in Jacuzzi jet-type pumps where water under pressure is forced down the pressure pipe to the jet nozzle. The stream emerges from the nozzle at a high rate of speed, creating a vacuum around the entrance to the venturi tube.

Atmospheric pressure, exerted on the surface of the water, forces it from the well in through the foot valve to fill the existing vacuum around the tube entrance. The water being forced through the jet nozzle mixes with the incoming water from the well. The velocity of this combined stream raises the water up the suction pipe to the centrifugal pump which then imparts additional pressure to the stream, thus feeding the pressure pipe and the pump discharge in an uninterrupted cycle of automatic operation.

The service life of metal products can sometimes be increased appreciably after careful studies are made to improve parts which lose their usefulness through excessive wear, corrosion, fatigue, or because of breakage. A change in alloy specifications may accomplish wonders. Bridgeport's laboratory will be glad to help customers in the selection of copper-base alloys needed to fulfill special requirements.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

New Optical Measuring Instrument is said to measure angles to within one second of arc, and length to two-millionths of an inch, with an accuracy of 0.1% of full scale. Typical applications include dimension measurements from zero to any gage block dimension; parallelism of two or more surfaces; angle of rotation of any surface; flatness; static or dynamic strains; measurements of weights and forces. **No. 870**

Weatherproof Marking Inks, especially developed for color code and specification marking on metal, wood, rubber, glass, etc., are claimed to be waterproof, weatherproof, fade-resisting and resistant to oil, solvents, acids and alkalis. Available in colors for machine and manual marking. **No. 871**

A New Needle Valve is said to provide adjustments as delicate as those of a micrometer. Stainless steel stem, in solid brass body, has 40 threads per inch, allowing valve to be opened or closed in tenths of a thousandth inch. **No. 872**

Follower And Center Rests featuring wrenchless adjustment and locking of jaws are announced. Each jaw has knurled knob for adjusting jaw position and thumbscrew for locking. Double-acting compound screw thread provides 3/16" travel for each knob revolution. **No. 873**

New Spring Testing Machine is said to permit high-speed testing of extension and compression springs up to 12" long at loads up to 5 lbs. It will (1) determine loading required to extend or compress spring to given length, (2) find exact compressed or extended length for given load, and (3) read position of the pointer with both the beam loading and the position of the compression or extension head fixed and invariable. **No. 874**

BRASS, BRONZE, COPPER, DURONZE, NICKEL SILVER, CUPRO NICKEL

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STRIP AND SHEET—For drawing, stamping, forming, spinning. Leaded alloys for machining, drilling, tapping. Silicon bronze, phosphor bronze for corrosion resistance. Alloys suitable for springs. Engravers' copper and brass.
WIRE—Cold Heading alloys for screws, bolts, nuts, nails, fastenings, electrical connectors. Phono-Electric trolley and contact wires.

ROD—Alloys for screw machine operation. Duronze III high strength, corrosion-resistant, good for machining and hot forging. Hot forging and cold heading alloys. Welding Rods. Copper-covered ground rod.

TUBING—For miscellaneous fabrication. For condensers and heat exchangers. For water, air, oil and hydraulic lines.

DUPLEX TUBING—for conditions too severe for a single metal or alloy.

PIPE—Brass and copper for plumbing.

FABRICATED GOODS—Plumbing brass goods. Radiator air valves. Aer-a-sol insecticide dispensers. Automobile tire valves.

TECHNICAL SERVICE—Staff of experienced, laboratory-trained men available to help customers with their metal problems.

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TECHNICAL LITERATURE—Manuals and handbooks available for most products.

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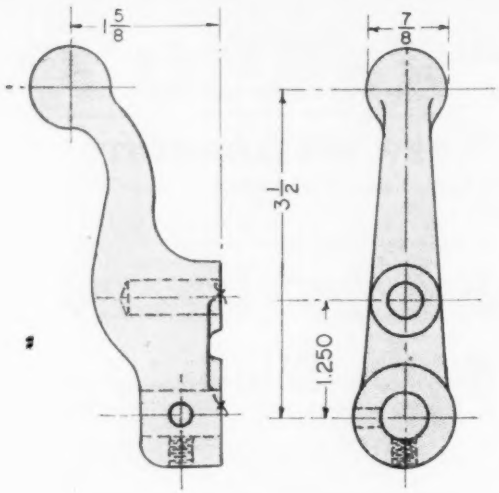


Milling Fixture Design

Promotes Accuracy, Cuts Lost Motions

Means of positioning workpiece made movable to compensate for changes in contour of casting or forging on which no finished surfaces can be used for locating tool

By ROBERT MAWSON

WHEN designing production tools, jigs or fixtures, it is good engineering practice to use finished surfaces or holes as locating mediums wherever possible. When a piece can be placed in the tool and located with a finished surface the parts machined in that tool, if it is properly designed and used, will be interchangeable as regards the operation performed by this piece of equipment.

However, if machining jobs are to be done on a casting or forging, where no finished surfaces can be used for locating the piece in the tool, means of positioning the workpiece must be made movable. This designing procedure is necessary in order to make adjustments in locating positions to compensate for any changes in contour of the piece being machined.

Fig. 1, above, shows a table shifter handle, made of a cast aluminum alloy, which is one of the details used on the milling machines built by Van Norman Co., Springfield, Mass. First operation on this piece is to polish all over. Next job is to mill the two bosses (f). Fixture used for this operation is shown in Fig. 2, below.

This fixture is made with a cast iron base (A) with an opening on each side of a size suitable for bolts to fasten the tool on the machine table. The base is finished on the surfaces (f) and then two machine steel keys (B) are fastened in the machined slot in the bottom surface with socket head screws. In the center boss a 3/8-inch hole (C) is drilled and then reamed.

A fixed jaw plate (D), is fastened to the vertical wall of the base with four hexagon head screws. Two bosses are acetylene welded on the movable jaw plate (E). After these bosses are positioned, their inside surfaces are machined to have a good rotating fit on the center boss of the base. Next, a ⅜-inch hole is drilled and then reamed in the two bosses to be in alignment with the center boss. A tool steel pin (F) is then placed through the holes in the bosses and held in place with a ¼-inch headless set screw in a tapped hole in the center boss and entering a depression which was machined in the pin.

To the fixed jaw plate (D) a V-block (G) is fastened with two dowel pins. A V-block (H) also made of machine steel is fastened to the plate (E) with two socket head screws and two dowel pins. Locating surfaces on the two V-blocks are machined to suit the contours of the two bosses of the workpiece to be machined in the fixture. After these surfaces are formed, serrations are cut on the faces. The finished machined V-blocks are then carbonized and hardened ready to be fastened in their respective positions on the fixture.

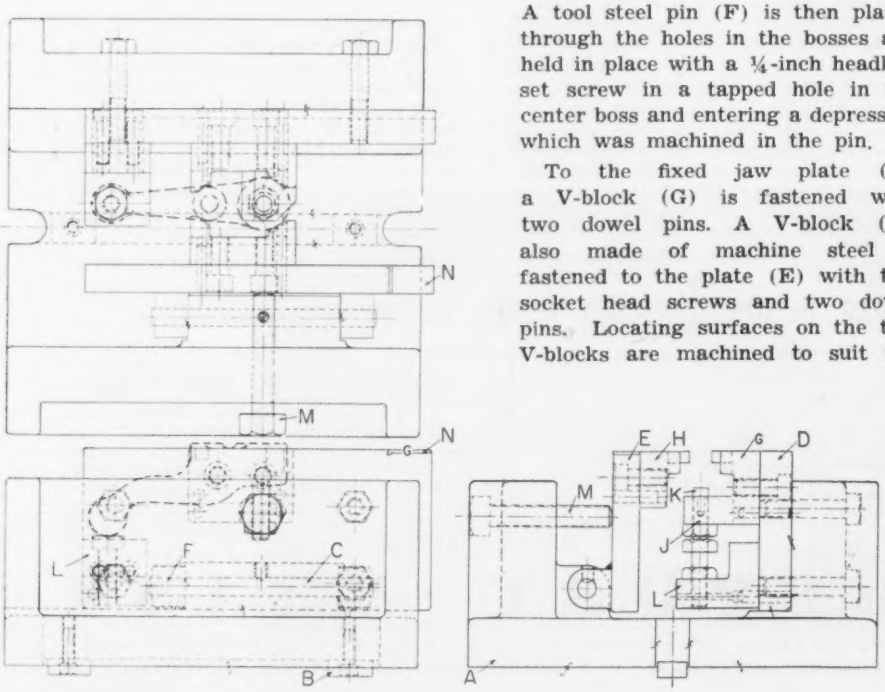
In the lower portion of the V-block (G) a ⅜-inch set screw (J) is placed. This can be adjusted and then fastened in place with a hexagon nut. In a hole in the top end of the screw a brass shoe (K) is placed. The work rest block (L) which has been accurately positioned, is made of machine steel and is fastened to the fixed jaw plate (D) with two socket head screws and a dowel pin. In this block a ⅜-inch hexagon head screw is fastened in position, after it has been adjusted, with a hexagon nut.

In a tapped hole in the forward vertical wall of the fixture base is placed a hexagon head pusher screw (M). Right end of the movable jaw plate (E) is hardened and then a surface (N) ground. This surface is used for placing gage on it to determine the correct position for the milling cutter to machine the workpiece.

The fixture is first placed on the machine table and located by the two keys (B) fitting in one of the slots of the machine table. Hexagon nuts being tightened on two T-head bolts which have been placed in the table slot and through the openings in the fixture base hold the fixture securely in place. Screw (M) is then moved back and as the pressure is removed from the movable jaw plate (E) this swings back by rotating on the pin (F).

One of the pieces to be machined is then placed in the fixture resting on the head of the hexagon screw in block (L) and on brass shoe (K). The screw (M) is then screwed inward and this motion pushes over the plate (E) with the V-block (H). As

(*Please turn to Page* 148)



Working Conditions

Emphasized in New Norton Grinding Wheel Plant

TO provide ideal working conditions for employees in the abrasive industry was one of the aims of Norton Co., Worcester, Mass., when plans were being made for its new $4,300,000 plant which was dedicated recently (STEEL, Sept. 6, p. 63).

The building, which is said to be the world's largest plant devoted to manufacture of grinding wheels, contains the latest equipment in the way of fluorescent lighting, ventilation, dust collection and fire protection as well as modern locker and shower rooms, cafeteria, hospital and offices. The facilities were planned to accommodate 800 persons on two shifts.

Eighty-two per cent of the wall area is comprised of windows to permit entry of a maximum amount of daylight. Monitor-type roof also is designed to permit light entrance and allow for maximum ventilation. Personnel reach their jobs on cross-over bridges built over the production lines.

Over 602 feet long and 320 feet wide and containing approximately five acres of manufacturing space on one floor, the building is ideally suited to straight line production. Parallel lines are set up throughout the length of the plant. Modern conveying equipment is used extensively. Each line features specially designed kilns where grinding wheels are electrically fired. Total cost of the equipment used throughout was $2.5 million.

Construction of the building was started in 1947 after a new process for making grinding wheels had been pilot-plant tested. Prior to the dedication, manufacturing had been taking place for some months. In fact, in the dedication ceremonies, the ten millionth wheel made by the new process was presented.

Fig. 1—Five acres of manufacturing space are contained in the new Norton grinding wheel plant shown in the left foreground. The rest of the facility stretches toward the background

Fig. 2—Success of the new manufacturing process responsible for building the $4.3 million Norton plant is dramatically revealed by the presentation at the dedication ceremonies of the ten millionth wheel produced. George N. Jeppson, chairman and envisioner of the process, left, is shown with Milton P. Higgins, president

Fig. 3—One corner of the new plant contains the conveyorized production lines for finishing operations on mounted points and internal grinding wheels

Forging Practice

(*Concluded from Page* 103)

bending, and the shape of the forging must be considered together with the type of bending tools or dies and the equipment with which the bending operation will be performed. Many interesting shapes can be made by forming after forging.

Bending and forming operations vary from simple hand operations to elaborate press operations, depending upon the kind of bend to be made and upon the production quantities. Hand bending may be an operation at the anvil with a hand hammer, forming the stock around a small block, it may be done on a hand-bending machine where the proper shape is given in a plate around the pivot point and the heated bar is wound around the plate by the use of a long handle on a pivot. Hand bending operations are usually hot and on small diameters, where quantities are not large enough to justify the cost of press bending or bulldozer bending tools.

Press bending dies may be relatively simple or they may be quite complicated. Fig. 59 shows a simple set of press bending dies, and Fig. 60 sketches a set of folding dies for bending. The folding dies are desirable where rubbing along the surfaces is not desired, or where bosses or buttons on the forging do not permit a rubbing action. It is important that all bending dies are made to fairly exact sizes, and that due allowances have been made for stretching and springback.

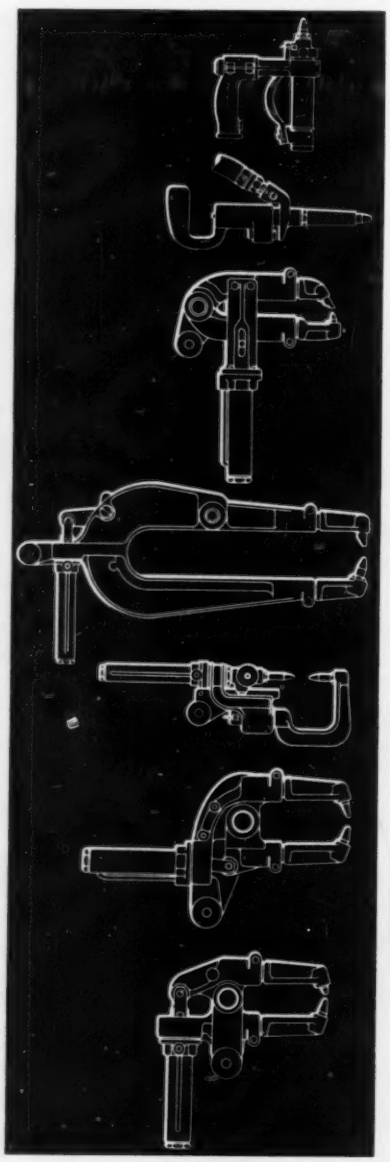
When quantity of forgings is small and it is not necessary to hold to close limits, bending and twisting operations can be performed under some types of hammers such as the general forging hammer. Generally, inexpensive hand tools can be used to approximate the desired shape of bending.

Round forgings of the cup or ring type are often pushed through ring dies to straighten the sides and to eliminate draft. The forging is pushed through the draw ring in a mechanical or a hydraulic power press. Drawing operations are generally performed hot.

(*To be continued*)

—o—

Description and illustrations of the portable material elevator designed by American Hoist & Derrick Co., St. Paul, is contained in a new eight-page catalog published by the company. The elevator, which is self-erecting when used at heights of 47 feet or under, can have a platform lift of 90 feet. Either a concrete bucket or a 6 by 6-foot platform may be used.



Spot Welding Guns Standardized

In Seven Basic Designs

DESIGN and construction of really standardized spot welding guns with interchangeable component parts in order to reduce cost and design time and also insure quicker deliveries and greater ease in getting replacement parts was announced recently by Progressive Welder Co., Detroit. Seven basic gun types, in heavy duty and standard duty versions as shown in accompanying illustration, have been developed to take care of an estimated 95 per cent of all gun welding applications.

Standardization of parts seems to be the answer to many of the problems that have plagued both builders and users of welding guns. With custom made guns, the user had to pay a high price for the welding gun and had to wait a considerable period of time while it was designed and built. In addition, replacement parts were a headache since there were no readily available stocks of parts anywhere. Manufacturers shared in this headache because they accumulated designs and patterns for hundreds of guns, some of which differed very slightly. Progressive Welder, for example, designed and built close to 3000 types.

In the new designs, basic standardized components of welding guns are: Gun chassis, jaw extensions, interchangeable hydraulic or air operating cylinders, optional cable locations, handles, cable terminal clamps, switches, electrodes and electrode holders. As many as 57,600 practical variations can be secure with a single basic gun chassis while varying only jaw extensions and standard electrodes.

An important feature of this line of guns is that they will take interchangeable hydraulic or air operated cylinders to suit individual plant requirements. Hydraulic cylinders are also designed for optional top or bottom connection of hydraulic line with cylinders themselves serving as gun handles. For air operation, standardized double end handles which may be locked in any position on top of cylinder are furnished.

Special variations of parts which cannot be covered with completely standardized gun line may be secured.

From top to bottom, the basic standardized gun types are: Scissors action, bell crank action, C-type direct action, deep throat rocker arm, clam action, push type (solid or spring loaded) and expansion gun (cable or cable-less). All of guns may be either hydraulic or air operated except deep throat type which is hydraulic only

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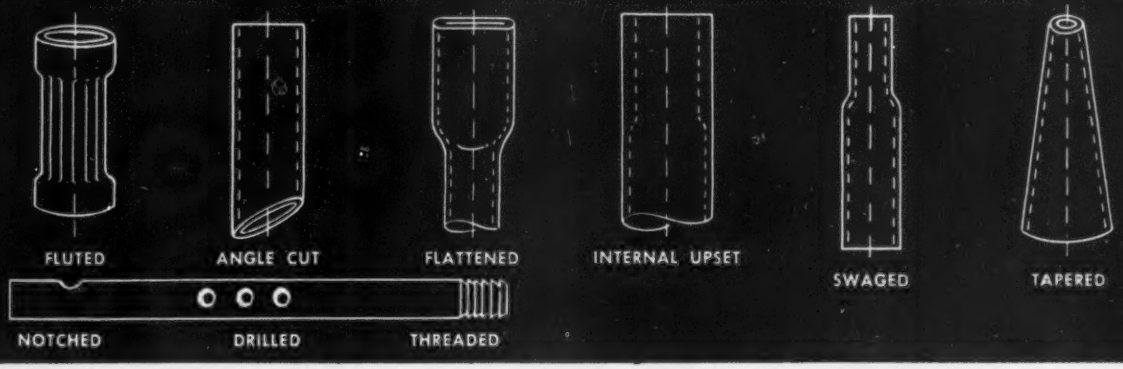

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By C. R. HOLTON
Vice-President
Bethlehem Steel Co.
Bethlehem, Pa.

Future Scrap Sources

FOR THE STEEL PLANTS

Recent war afforded us many lessons which must not be forgotten now that we are back at peacetime operations. Most important probably was the more systematic methods of collecting industrial scrap, with careful segregation into grades, and with extensive facilities for shearing, briquetting, bundling, cleaning and degreasing

WITH the possible exception of a period during the last world war, there has always been an adequate supply of scrap for the iron and steel industry in the United States. Procurement of scrap became a problem of major proportions during World War II, and country-wide scrap drives were organized on two different occasions to meet a threatening situation.

Collection and preparation of scrap, including sorting, segregation, and bundling were carried out to an extent never before attempted. Also steel companies went to great lengths to utilize the many grades of alloy scrap, turnings and drillings, produced in unprecedented quantities by the war industries. Reclamation of used tin cans yielded hundreds of thousands of tons of steel scrap in addition to appreciable quantities of high-strategical tin. Thanks to these efforts, and to the co-operation on the part of all concerned, output of steel was not seriously affected by lack of this needed material.

However, the prolonged strain of obtaining sufficient scrap to keep the steel furnaces going left the industry acutely aware of the seriousness of the scrap problem. The industry's concern has been strengthened, rather than alleviated, because of the lack of any improvement in the scrap situation during the postwar years. Today we all are making every effort to find ways and means whereby we may again return to the happy state where scrap will be available when and as it is needed.

Anyone attempting to size up the present situation and peer into the immediate future must be a person of courage and the possessor of vision. Edwin C. Barringer, executive vice president of the Institute of Scrap Iron and Steel Inc., is responsible for the statement that "scrap is the most difficult commodity to tie down statistically". So what I have to say here should be accepted in that light.

Scrap Defined—Before proceeding any further, let us first see what is meant by scrap. It may be well to point out, should anyone overlook the fact, that scrap is one of the basic raw materials in the production of

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steel. Practically one-half of the materials going into the steel produced in the United States today is scrap, which, to use the War Production Board's definition, "includes all ferrous materials—alloyed or unalloyed, of which iron or steel is the principal component, which are the waste of industrial fabrication or objects that have been discarded on account of obsolescence, failure, or other reasons."

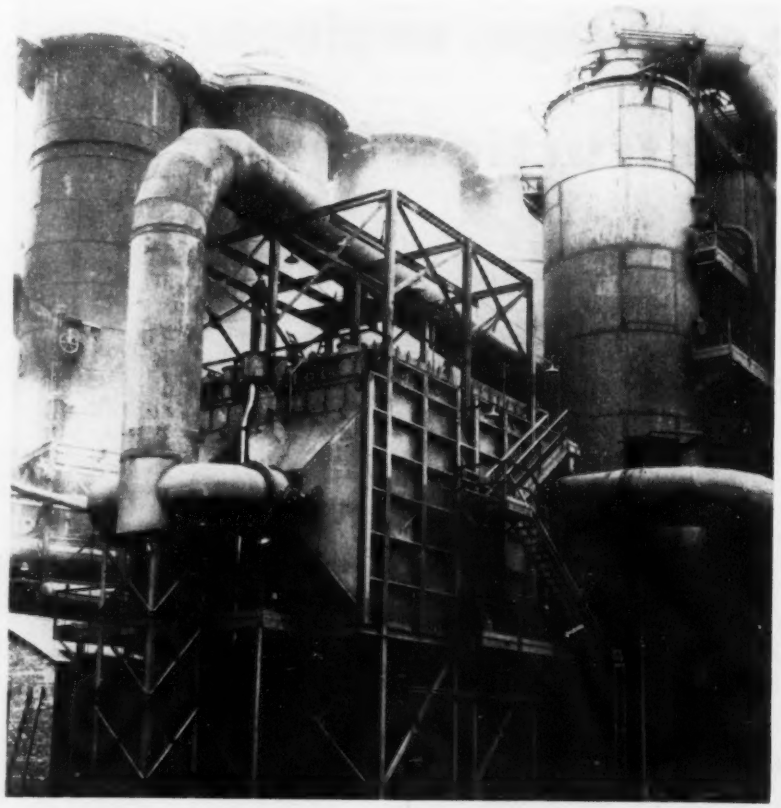
An interesting fact about scrap is that it is the only one among the principal raw materials used in steelmaking over which the larger steel producers do not have some measure of control. The collection, preparation and shipment of scrap are performed by outsiders who have not become what is known in the industry as "captive". This statement refers only to that part of the scrap generally known as purchased scrap, which is about one-half of the entire scrap tonnage. According to Mr. Barringer, there are about 4500 dealers who ship one or more cars of scrap a month, with about 200,000 people employed in the collecting, sorting, and disposal of the scrap and associated materials.

The name, scrap, may lead to the idea that its use as a raw material must be confined to the production of inferior or second-rate products. This is not the case, however. Scrap and pig iron, the two principal sources of metallics in steelmaking, are actually interchangeable in most cases. Properly prepared scrap, though it may be rusty, battered, and broken, is always composed of previously refined steel. If anything, it therefore generally contains less impurities than pig iron, and, pound for pound, the better grades offer higher metallic yield than the latter product.

In the production of open hearth steel, by far the larger proportion of steel made in this country, approximately half of the metallic charge is scrap, and the remainder almost all pig iron. The bessemer converter operates almost entirely on pig iron, while the electric furnace is practically always charged with scrap only. In iron foundry work, scrap and pig iron are generally used together, a normal charge consisting of about two parts of scrap and one part of pig iron.

Primary Scrap Classifications—There are two main classifications of scrap used in steelmaking, home or revert scrap, and outside or purchased scrap. Home scrap, as the name implies, is produced by the steel industry itself, mainly in the form of crop ends of blooms, slabs, billets, bars and others of the numerous shapes turned out by a steel plant. It is always consumed at the point of origin and, therefore, it is not traded on the open market to any great extent. Purchased scrap is produced wherever steel is used, and is collected, sorted, prepared, and stocked by scrap dealers. It includes industrial or factory scrap, produced in thousands of factories and industrial establishments throughout the country, in the fabrication and processing of steel into countless commodities by machining, stamping, drawing, forging, or other processing methods. This is the largest individual source of purchased scrap, estimated at 40 per cent of the total. In peacetime 10 to 12 per cent of the steel shipped to metalworking plants ends up as scrap and is returned to the steel plants with comparatively short delay. Such scrap is therefore frequently referred to as prompt industrial scrap.

Next in importance is the scrap originating in the country's railroads, through obsolescence, wear, or other factors. The principal sources are rolling stock, rails, bridges, shops, and equipment. This is normally about 15 per cent of all scrap collected. Following these two sources are the automobile graveyards from which come body parts, fenders, axles, and many engine parts not suitable for reuse. Other important sources of scrap are the nation's millions of farms, the public utilities, and the petroleum industry. Ship breaking normally produces a certain amount of scrap and this source always tends to yield an extra tonnage during the years immediately following a major war, such as the present period. Scrap is also created by demolition of factories and large industrial and commercial buildings, old bridges, tanks and similar structures. Finally, we have the scrap originating in the home, picked up in trash piles and on



BLAST FURNACE PRECIPITATOR: In tests, this electrostatic precipitator, now in use at a midwestern steel plant to clean blast furnace gas, provided an efficiency of 98.5 to 99.4 with actual residual of 0.002 to 0.00048 grains per cubic foot. The unit, capable of processing 80,000 cubic feet of gas per minute, is the latest product of Koppers Co.'s Baltimore plant, and can be used for many other applications including removal and recovery of tar oil and water from coke oven, producer, and carburetted water gases, and in metallurgical operations where metallic products are recovered from gases emanating from reverberatory, electric roasting and sintering furnaces

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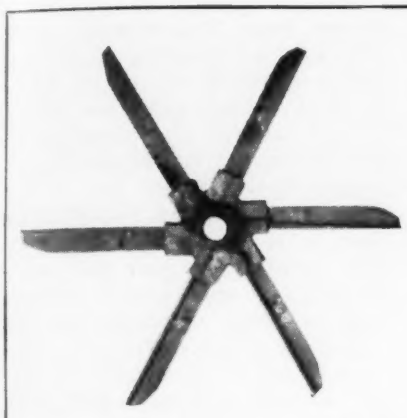

Fig. 1. Original construction. Riveted steel blades cast in iron hub. Cost approximately 25¢ per pound including riveted blades.

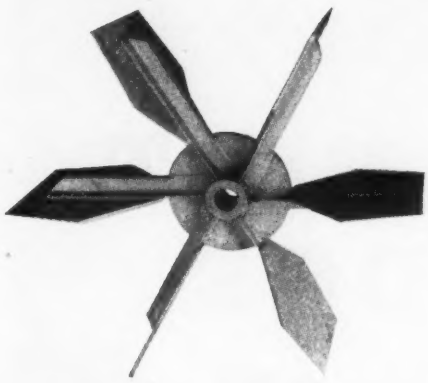

Fig. 2. Present all-welded steel construction. Steel blades and spokes arc welded to a steel plate hub. Cost approximately 20¢ per pound.

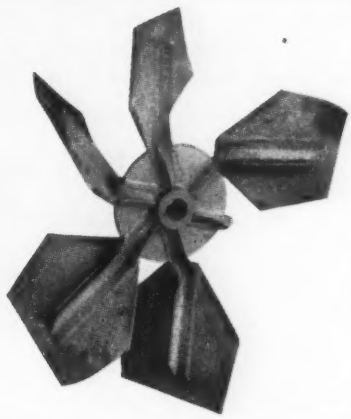

Fig. 3. Damaged all-welded steel impeller shows welds intact.

By W. R. Patterson, Superintendent
Dixie Manufacturing Company
Baltimore, Maryland

PART of our business is building planing mill exhaust fans for all types of industrial applications. Since each unit must be built to individual order, our shop fabricating methods must be very flexible if costs are to be held down. Arc welded construction has proved to be the only practical solution to this manufacturing problem.

Arc welding enables us to use all types of mild carbon and stainless steels with a resulting stronger product. By eliminating many time-consuming delays waiting for parts originally needed for this work, our manufacturing schedule has been cut from 4 months to 4 weeks. This prompt delivery gives us a decided sales advantage to customers requiring quick shipment.

The superiority of our welded design has already received wide customer acceptance. A number of old line customers now insist they will accept nothing but welded construction.

The impeller unit (Fig. 1) was originally constructed by casting the fan blade spokes into an iron hub. To these spokes we riveted the fan blades at a total unit cost of approximately 25¢ per pound. Under heavy load conditions, a break in the hub would cause the impeller to "explode" resulting in major damage to the blower unit and bothersome delay for the customer making repairs.

The present all-welded impeller (Fig. 2) has the blade spokes, consisting of two angles, arc welded to a flame-cut steel plate hub. The blades of shear-cut plate are welded to those spokes. The cost of the arc-welded impeller is approximately 20¢ per pound, representing a reduction in cost of approximately 5¢ per pound or 20%.

The greater strength of the welded construction is illustrated by a mishap in which a heavy block was accidentally sucked into the blower intake. The photo (Fig. 3) shows how the blades were bent. Although the force of the mishap sheared the steel angles, the welds themselves remained intact.

The all-welded drive-shaft foundation base (Fig. 4) replaces a heavy cast base. Component parts are sheared from steel plate and assembled with arc welding, using "Fleetweld 7" and 400-amp. Lincoln "Shield-Arc" welders. A previous cast iron suction intake has been converted similarly to arc welded construction by fillet welding flame-cut plate to formed frame members.

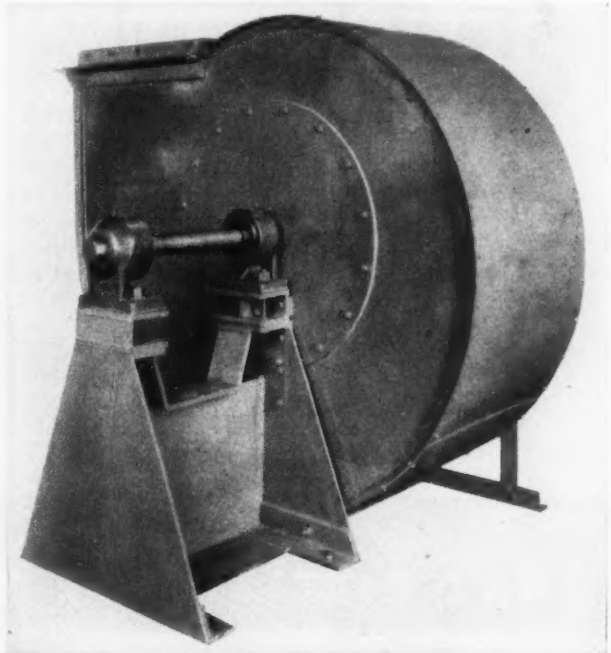

Fig. 4. Complete blower unit. Shows all-welded drive shaft base and suction intake. Cast base cost 15¢ per pound. Welded steel base cost 12¢ per pound.

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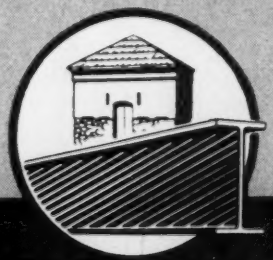

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city dumps by junkmen and peddlers. A typical ratio between the scrap obtained from these different sources is: Industrial scrap, about 40 per cent; railroad scrap, 15 per cent; and the remainder, or dealer's scrap, 45 per cent.

Present Scrap Requirements — In 1947, with a production of approximately 85,000,000 net tons of ingots and steel castings, and about 13,500,000 net tons of iron castings, the steel and foundry industries consumed roughly 58,470,000 net tons of pig iron and 59,400,000 net tons of scrap, close to a 1:1 ratio. Incidentally, since statistics first were made available the only year in which the tonnage of scrap consumed has not topped the tonnage of pig iron was 1940. Of the scrap used by the steel and foundry industries last year, 31,338,000 net tons was home scrap and 28,081,000 net tons purchased scrap, also very near to a 1:1 ratio. This is about two million tons more purchased scrap than the former record consumed by the steel and foundry industries of 26,238,990 tons, set in 1942. The above ratio between home scrap and purchased scrap has really remained fairly constant since 1935, the first year in which the U. S. Bureau of Mines published statistics on these materials.

Importance of an annual consumption of approximately 25,000,000 tons of purchased scrap in the nation's economy can hardly be overestimated. When one considers that the production of a corresponding amount of pig iron would require the mining and transportation of approximately 50,000,000 tons of iron ore, 35,000,000 tons of coal and 10,000,000 tons of limestone, the saving in natural resources becomes a factor of primary importance. To produce this amount of pig iron would take at least 50 or 60 of our latest-type blast furnaces. Furthermore, while open hearth furnaces may be operated on a 100 per cent pig iron charge, this practice is not desirable from the metallurgist's point of view and would necessitate an appreciable addition to our present open hearth capacity.

The likelihood that the present heavy demand for scrap will continue for a number of years is naturally closely tied up with the steel industry's ability to maintain today's near-capacity output. With the world in its present troubled state all forecasting becomes extremely difficult, but barring major disturbances at home or abroad, the present high rate of industrial activity seems pretty well assured for some time to come. Pent-up need for consumers' goods will require a long time to satisfy and should not

be soon curtailed unless some major economic set-back or similar disturbance should occur. We should therefore be prepared for an annual requirement of not less than 25,000,000 tons of purchased scrap.

Overseas Shipments Disturbed Balance—The five years of war through which the world has just passed did more than anything else to disturb the equilibrium between scrap and pig iron, which had been maintained so well during the many decades this country has been a factor in world steel production. The last war was essentially a mechanized war. It is estimated that the amount of steel required for each soldier, for hand weapons, tanks, guns, planes, ships, and so forth was about 4900 pounds, compared with 90 pounds per man in the first world war. And the United States, "Arsenal of Democracy", supplied the major part of this tonnage, to the tune of an estimated 150,000,000 to 225,000,000 tons, most of which went abroad, and only an infinitesimal part of which has so far returned to this country in the form of scrap.

Now let us consider another factor, the export of scrap as such. As pointed out, this country has always been self-supporting as far as scrap is concerned. Through the years practically all purchased scrap has been of domestic origin. Going back to the first years of the present century we find that a small tonnage of scrap was imported, while an equally small tonnage was exported. In the late 20's a significant change became noticeable. Slowly the exported tonnage started to mount, increasing during the 30's and going as high as over 4,000,000 tons in a single year. The exporting was allowed to continue, although members of the steel industry urged the government to restrict the outflow of scrap, and it did not stop until the war put an end to the drain. During the period of 1930-1940 over 20,000,000 tons of scrap were thus sent abroad. Add to this the conservative figure of 150,000,000 tons sent abroad in the form of war materials and armaments, and we find that, conservatively speaking, a total of 170,000,000 tons of steel left the country over a period of about 15 years. The larger portion of this is no doubt irretrievably lost and will never come back to these shores in the form of scrap.

Battle Scrap Return Disappointing—At the end of the war, hopes were high that much of this scrap would eventually find its way back to hungry steel plants in the United States. Due to a number of inherent diffi-

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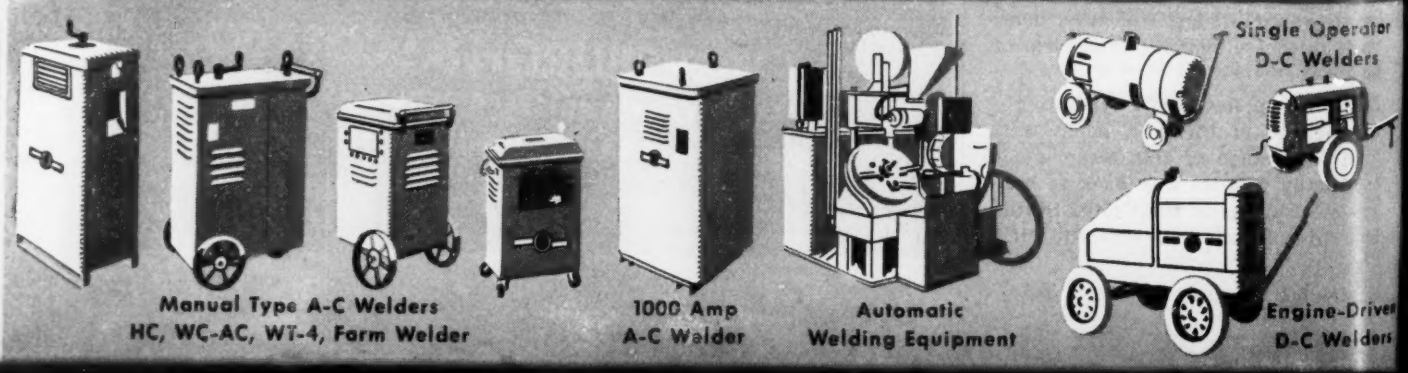

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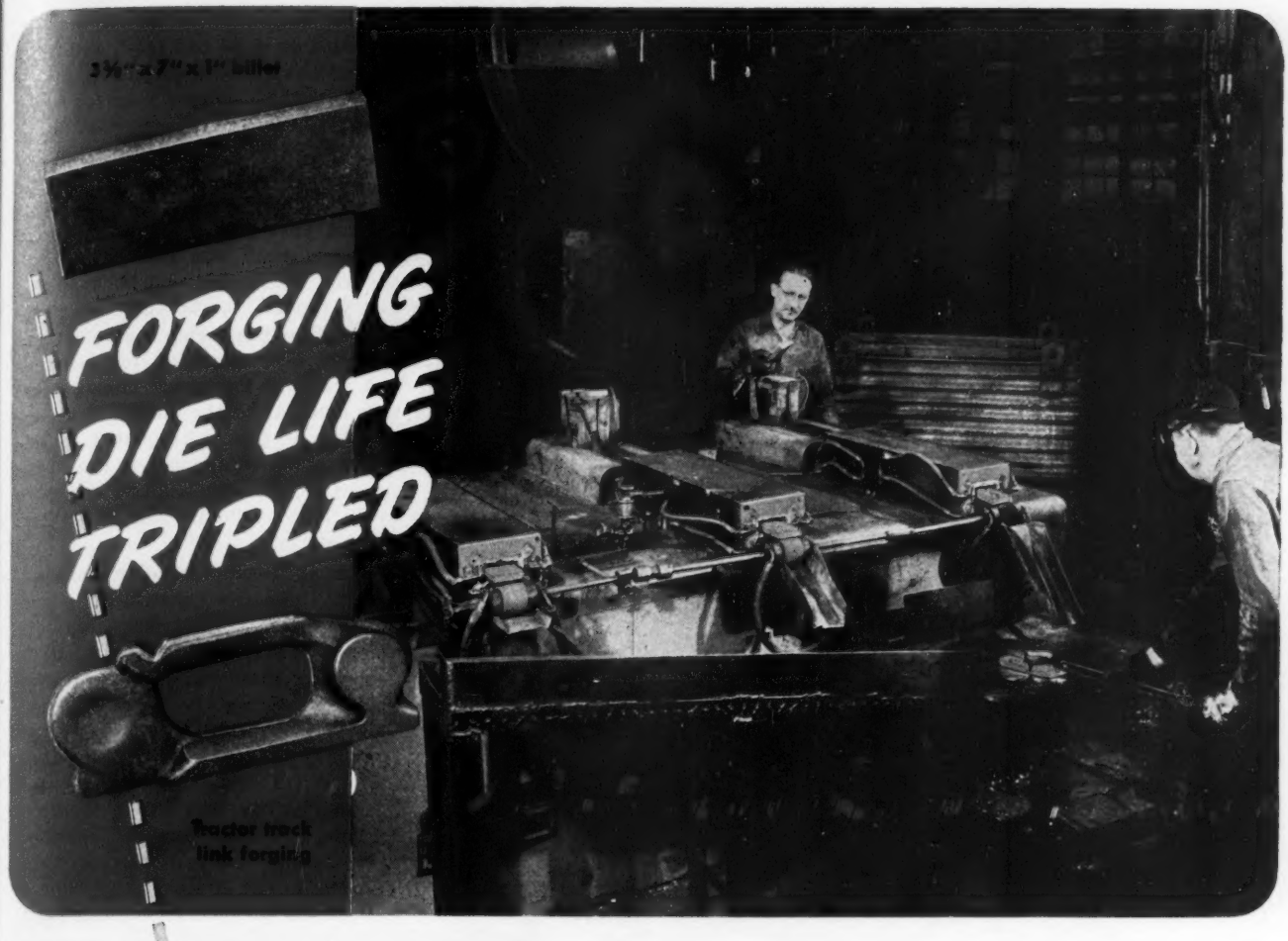
culties, this hope has so far not materialized. By the end of 1947, less than a million tons of the scrap had returned to the United States. Lack of overseas personnel capable of salvaging and preparing the scrap, and limited shipping facilities have hampered its return. There is no question, of course, that the potential overseas scrap supply is very great. Two commissions, one of which has just recently returned, have already been in Europe to study the situation, and their findings should aid in arriving at the best solution to the problem.

Collection of Pacific battle scrap has also been studied by an overseas commission. Collection of this material offers even greater difficulties than those encountered in Europe, as so much of the scrap is located on small and widely scattered islands, with limited or practically non-existing harbor and loading facilities, making shipping difficult and costly. However, some scrap has already found its way back from that area, as, for instance, a part of the 1,000,000 tons contracted for by Bethlehem Steel Co. from the Chinese government.

World War II did much to disrupt scrap-consuming centers in Europe and Japan. Much scrap normally disposed of at these centers is now available on the world market and United States consumers should share substantially in this tonnage. Scrap is actually starting to move from various points in Europe and from the Pacific. Indications are that this movement will continue in increasing volume. It is important that domestic supply be augmented by imported tonnages. However, it is also obvious that as both scrap and finished steel are urgently needed in Europe, the American contribution to the recovery program may be made at least partly in the form of scrap already over there, rather than through export of finished steel products, which are almost as urgently needed in this country.

Domestic Scrap Supply At Present—Having thus disposed of scrap from abroad, and having come to the conclusion that whatever may be available from that source it will not alone alleviate the present tight situation, let us now consider the domestic field and see what it may have to offer.

Two years ago, Mr. Quincy Bent estimated that a production of 80,000,000 to 85,000,000 tons of steel ingots would require about 20,000,000 tons of purchased scrap. Another five million tons will be required by the iron foundries. We will assume that the 1948 production figures will be on that order. With present stocks



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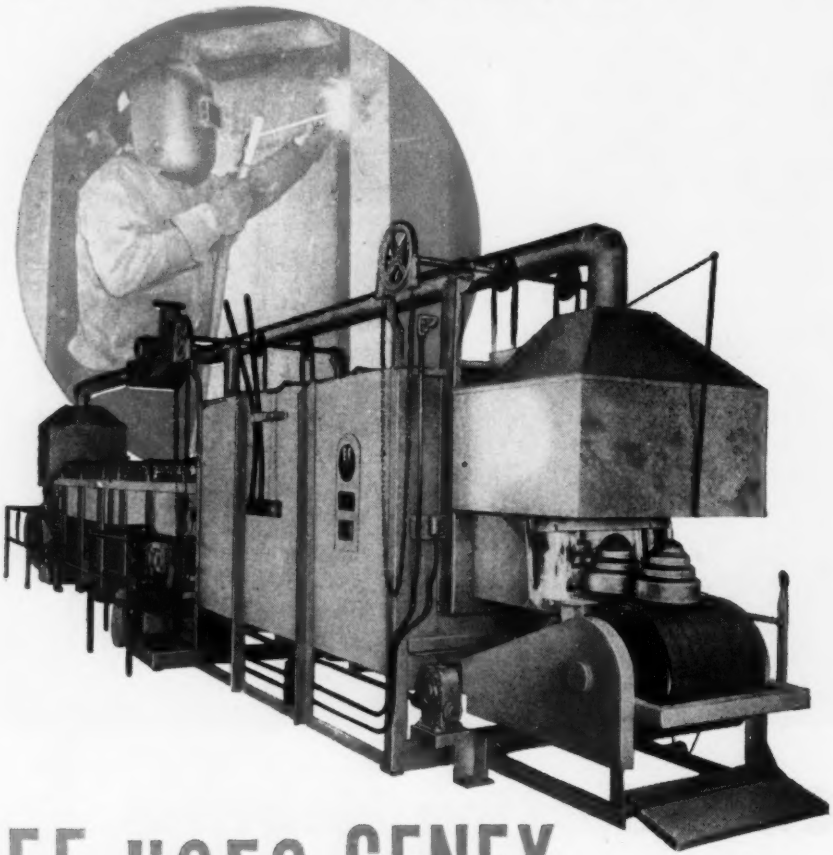

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of scrap sufficient for only a month's operation or so at this level, and with the outlook of a requirement of 25 million tons of scrap a year for some time to come, one of the most hopeful signs is the three million ton increase in pig iron capacity to be completed by steel companies during the present year. Some doubt has been expressed that this increase in the pig iron production will be available this year, due to the tight coke situation. However, much equipment has recently been installed for cleaning and washing low-grade coking coal, thus eliminating the main factor contributing to poor coke quality. In addition, many of the major steel producers are also constructing new coke ovens which should help to relieve the situation.

Effect of Technological Advances—Taking the major constituent in purchased scrap—industrial scrap—the amount made available should be in about the same ratio to steel shipments as during the immediate prewar period. There are some factors that may affect this ratio, but their effects will make themselves felt gradually. The proportion of heavy to light steels has changed considerably during the last two or three decades. In the 20's the production of light steels for consumer goods started to increase rapidly, due largely to the introduction of the continuous sheet-strip mill. While the ratio between light and heavy steels was 40 to 60 in the late 20's, it is closer to 45 to 55 today, with the upward trend of the light products still continuing. Higher tonnage of light steels, much of which is not recovered as scrap but is permanently lost, is a factor that must be considered.

Another technological advance in the steel industry is production of steels of greater resistance to corrosion, steels which will have longer life. This will tend to delay the return of a certain tonnage of steel to the scrap heap. The increasing use of low-alloy steels is a step in that direction. Better protective coatings on steel, both metallic coatings and paints, have the same effect. On the other hand, the increasing tempo of modern living tends to hasten obsolescence of materials and equipment, which will have the opposite effect by shortening the life of steel in many services.

Among technological improvements affecting the scrap situation we may also mention the progressive decline in ratio of home scrap to purchased scrap due to better utilization of the ingot, a tendency which continued progress should always maintain. Twenty-five years ago, the amount of

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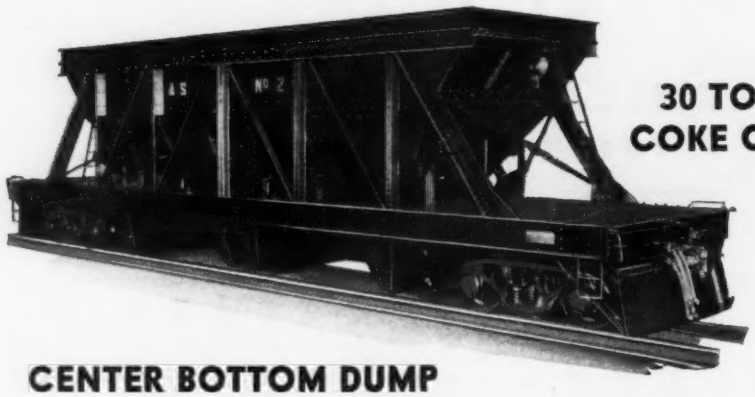

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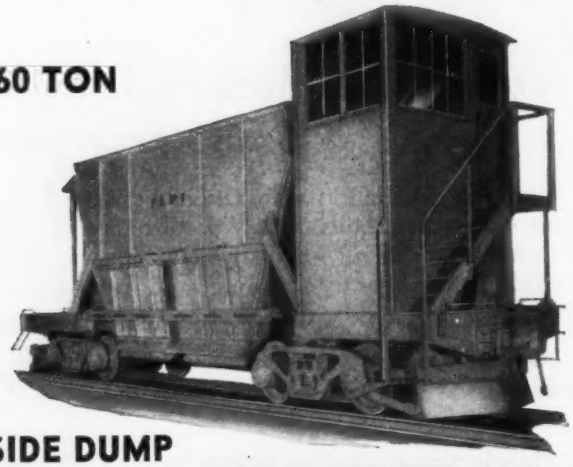

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1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

home scrap was approximately 29 per cent of the ingot weight. Today it is nearer 25 per cent.

Increase In Railroad Scrap Noted—Taking the second large scrap producer, we find the railroads, normally supplying over 3,000,000 tons of scrap annually, handicapped by lack of replacements for over-age rolling stock and other equipment. As such replacements gradually become available, scrap from that source should at least reach the former proportions. In fact, with the present high replacement schedule for both freight and passenger cars, and with the increasing trend from steam to diesel locomotives, an even higher than normal contribution may be looked for from this source.

The war caused a serious disruption of the automotive industry, one of our important sources of scrap. Lack of new models kept the public from replacing cars normally considered outworn, and the stream of scrap which regularly flowed from the automobile wrecking yards soon dwindled to a mere trickle. Furthermore, most of the relatively few automobiles withdrawn from actual service became sources of parts sorely needed in servicing the cars and trucks on the road. In fact, in June 1943, the scrapping of cars was actually discontinued by order of the War Production Board as the derelict cars were more urgently needed for supplying spare parts than as a source of scrap.

The present production of cars, over 4,000,000 units in 1947, although perhaps not as high as hoped for, and certainly not adequate to fill the dammed-up demand, is nevertheless sufficient to make a decided change in the outlook. As the older cars are being scrapped at an increasing rate, the automobile scrap yards should again begin to make shipments. Certainly, we should be allowed to expect more scrap from that source in 1948 than in the two preceding years.

Shipwrecking is another source which should yield more scrap this year and possibly for a few more years to come. Much depends upon the willingness of the government and the Maritime Commission to dispose of the older and less efficient types of vessels. During the past year about 75,000 tons of scrap were obtained monthly from this source, against about 15,000 tons a month in normal times, and the figures will probably be duplicated this year.

The great expansion and modernization program mapped out by a number of our larger public utilities also should release at least their normal quota of scrap as soon as the

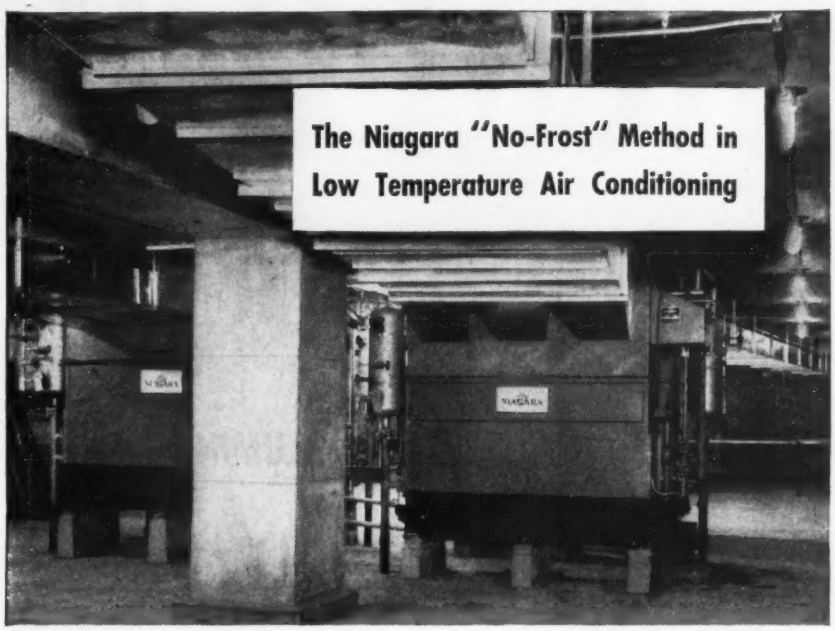
program has reached full stride.

The intense search for scrap during the past years, especially the two scrap campaigns during the war, has probably swept our farms, refuse dumps and homes more free from scrap than in normal times. However, new scrap is always generated at these sources, and the present high prices are probably drawing it out as well as may be expected. Here it may be well again to call attention to the potential tonnage of scrap from used tin cans. A source which, according to U. S. Bureau of Mines figures yielded 488,000 gross tons of scrap and 4,554 gross tons of valuable tin during the years 1942-45 should not be too lightly regarded.

Careful Preparation of Scrap Seen Essential—The recent war taught us many lessons which we must not allow to be forgotten now that we are back to peacetime operations. Most important was probably the more systematic methods of collecting the prompt industrial scrap, with careful segregation into grades, and with extensive facilities for shearing, briquetting, bundling, cleaning and degreasing. Importance of this work can hardly be overemphasized. Our scrap dealers can render most valuable service by keeping up this work and by further improving their yard facilities. While appreciating whatever progress has been made, we steel producers are acutely aware of the need for continued vigilance and further efforts to improve scrap preparation. We do not have to contend with the large amounts of turnings and alloy scrap which we had to handle during the last war, but the substantial tonnages of obsolete ordnance materials (tanks, guns, shells, etc.) now being scrapped in this country, plus the offerings of similar materials from overseas, are factors to be taken into account. Furthermore, alloy steels will always be with us, and indications are that today's (alloy steel:carbon steel) ratio is slightly above prewar figures. The use of sulphur in free-machining steels also imposes a problem which can only be taken care of by careful segregation.

The past year was a very difficult one for the steel mills. Scrap consumption and scrap prices reached all-time highs, and existence was on a hand-to-mouth basis as stocks dwindled down to a few weeks' supply. The outlook for the future is closely tied up with the general industrial situation. As long as the industrial activity, and with it our steel operations, is maintained at the present high level, the scrap market is bound to remain tight. Although no

Making or Holding Products Uniform



High Precision Industrial Air Conditioning with extremely dry atmospheres (or with high relative humidities) at low temperatures.

● Specializing for thirty years in the more difficult problems of air conditioning for industrial processes, this Company has developed a group of units that make it easier and less expensive for you to get the particular air conditioning benefits you may need for your special process, or to overcome some obstacle of climate or condition that is interrupting your production or causing loss from rejected parts or materials.

The Niagara "No-Frost" Method, for example, has been used to create temperatures as low as -90°F. in cold test rooms, and to provide air with only 1 gr. of moisture per lb. for special processing.

The Niagara Type "A" Air Conditioner creates any condition of temperature and humidity for a test or process, and if wanted, creates different conditions in different rooms simultaneously.

Some of the industrial applications of these units: internal combustion engines, motors and air craft, super-chargers and carburetors, gas cooling and controlled atmosphere process, film, plastics, fiber, rubber and adhesives control, biological processing such as penicillin, and yeast.

Write for a Niagara Blower Bulletin on a subject which interests you, or for the address of the nearest Niagara Field Engineer.

NIAGARA BLOWER COMPANY

Over 35 Years of Service in Industrial Air Engineering

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INDUSTRIAL COOLING HEATING • DRYING

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HUMIDIFYING • AIR ENGINEERING EQUIPMENT

NICKELOID

GILDS THE ALUMINUM LILY

CHROME OR NICKEL PLATED ALUMINUM SHEET

HIGH LUSTER

Yes, chrome or nickel plated aluminum sheets have a brilliant beauty which add eye-appeal to any product. A lustrous chrome or nickel finish on a durable aluminum base.

LONG WEARING

Yes, chrome or nickel plated aluminum sheets are absolutely rustproof and highly resistant to corrosion, tarnish, and wear. The nickel or chrome coating gives the aluminum base a harder, long-wearing finish.

EASILY WORKED

Yes, chrome or nickel plated aluminum sheets can be stamped, formed, bent and moderately drawn without harming their mirror-like surfaces. Available in a wide range of gauges and tempers to meet all needs.

CAN BE SOLDERED

Yes, chrome or nickel plated aluminum sheets solder easily, overcoming a difficulty in this direction experienced with plain aluminum. This quality thus simplifies manufacture in many instances.

LOW IN COST

Yes, chrome or nickel plated aluminum sheets are economical to use. Because of their light weight, they offer more square footage per pound than any other commonly used metal. Economical too, because they are pre-finished and require no plating or polishing after fabrication.

50 Years of Pre-plated Metal Leadership

The Story of Nickeloid

This year American Nickeloid Company is celebrating its 50th anniversary. In honor of the occasion we have issued an illustrated booklet which marks the significant milestones of the pioneer in the pre-finished metal industry. A copy will be sent to interested executives who write us on their company stationery.

AMERICAN NICKELOID COMPANY

Established 1898

PERU 1, ILLINOIS

immediate relief appears to be in sight, the following steps would do much to ease the situation: (a) Vigorous government measures to obtain part of the large surpluses of scrap now in continental Europe, particularly in Germany, and in the Pacific, including Japanese stocks, and (b) immediate release of some of the large stocks of war materials in this country now held by the War Assets Administration. The potentialities of these sources are sufficiently great to effect a material improvement in domestic scrap supplies.

From paper presented before American Iron & Steel Institute, New York, May 26-27, 1948.

Quality Control Meeting Planned for Nov. 4-5

Eight midwest sections of the American Society for Quality Control will hold their third quality control conference Nov. 4-5 in the Hotel Sherman, Chicago. As with past conferences, it is being sponsored by the Chicago Association of Commerce.

The program committee, chairmanned by Prof. Lloyd A. Knowler, University of Iowa, has organized the clinical and training sessions, and highlighting the 2-day meeting will be luncheon sessions featuring a speech by Col. Charles D. Wiman, president, Deere & Co., on the first day and Hugo A. Weissbrodt, works manager, Fort Wayne Motor Truck Division, International Harvester Co., on the second.

The list of speakers and their topics includes: George N. Cornell, chief chemical engineer, A. E. Staley Mfg. Co., Decatur, Ill., "Quality Control—A New Chemical Engineering Tool;" A. H. Becker, product control manager, U. S. Rubber Co., Indianapolis, "Operator Interest and Co-operation in Statistical Quality Control;" Ray W. Good, assistant chief inspector, Robertshaw-Fulton Controls Co., Youngwood, Pa., "Quality Control Procedures in Relation to Time Study;" Carl E. Hoover, quality control engineer, Perfect Circle Corp., Hagerstown, Ind., "Statistical Quality Control in the Manufacture of Piston Rings;" Dr. Carl E. Noble, quality control engineer, Kimberly-Clark Corp., Neenah, Wis., "Sampling in the Uncontrolled Process;" and Kort K. Pfabe, assistant factory manager, Carter Carburetor Corp., St. Louis, "Statistical Quality Control at Carter Carburetor Corp."

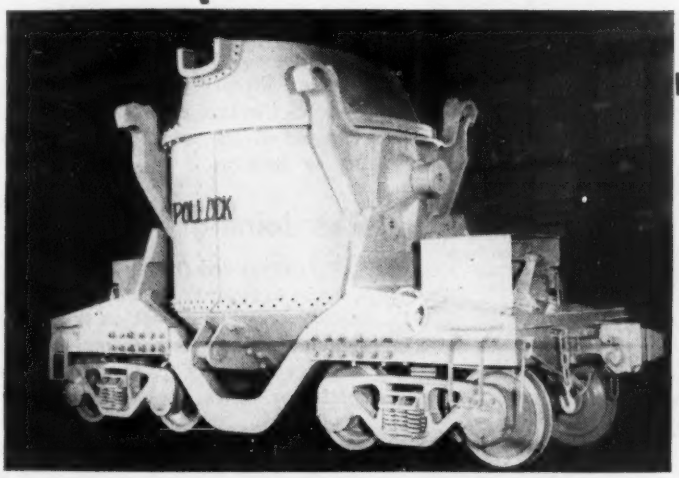
—o—

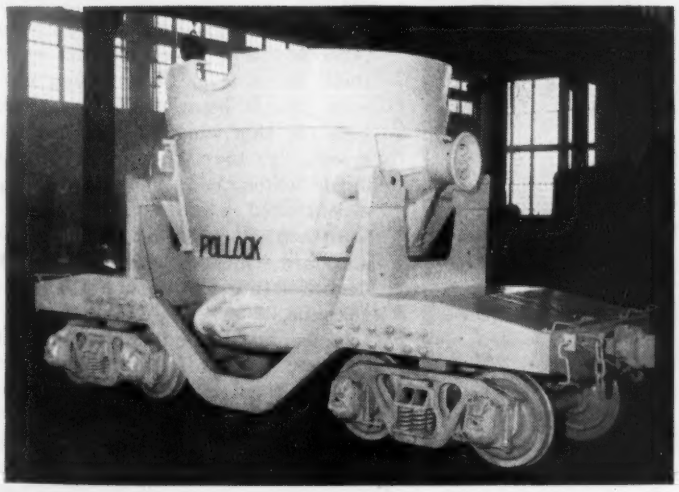
Expansion and modernization program of Illinois Zinc Co., Chicago, was completed recently according to an announcement from the company.

STANDARD OR SPECIALLY-MADE HOT METAL CARS . . .

POLLOCK

builds all types





Pollock hot metal cars are made in various capacities up to 95 tons, and can be built larger, depending on railroad clearances. The widely-used Kling type was introduced by Pollock for special heat-retaining properties, and both the Kling and Open-top type can be made for long pouring or short pouring. The car bodies are of welded steel construction—either all-welded in one piece, or with end and side frames bolted together to save space in shipping. Trucks have A. A. R. standard wheels, axles, bearing brasses and springs. In addition, special end-thrust bearings can be provided where standard A. A. R. bearings wear too fast, or roller bearings of your choice can be provided. Cars can be equipped with K brakes or AB brakes.

Pollock Company engineers will be glad to make a study of your hot metal handling requirements, and recommend the equipment best suited to your individual needs. Just call or write today—our trained experts will do the rest!

POLLOCK

THE WILLIAM B. POLLOCK COMPANY

YOUNGSTOWN - OHIO

STEEL PLATE CONSTRUCTION - ENGINEERS - FABRICATORS - ERECTORS

BLAST FURNACES - HOT METAL CARS AND LADLES - CINDER AND SLAG CARS - INGOT MOULD CARS - CHARGING BOX CARS - WELDED OPEN HEARTH LADLES

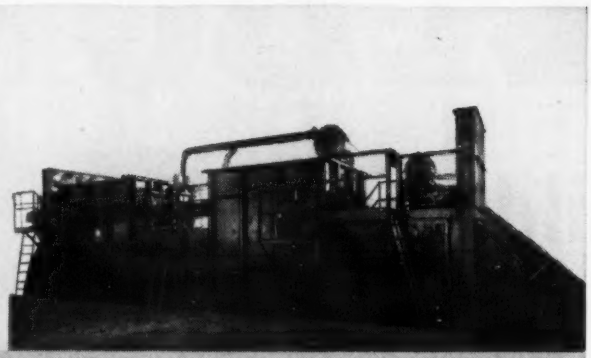
DEPENDABLE PRODUCT CONTROL

Automatically

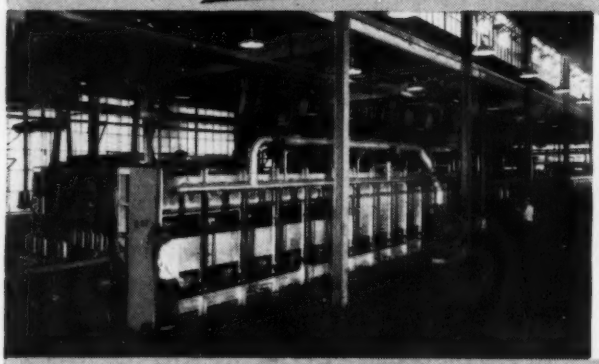
MAXIMUM FLEXIBILITY of heating rate . . . soaking period . . . product travel . . . and size, shape and weight of product!

Step-by-step control through multi-zone construction with separate heaters, fans and controls for each zone.

Mechanized conveyor and fully automatic control throughout. Forced convection heating recirculated for maximum heating rate and uniformity. Gas or oil fuel.



HAGAN *automatic recirculating* DRAW FURNACE



AUTOMATIC MOVEMENT of product through Hardening Furnace—Automatic Quench—Draw Furnace!

HANDLES irregular sizes, shapes, weights simultaneously or in sequence . . . with uniform results.

For gas, oil or electricity. Requires only a two-man crew! Alloy carriers are not quenched.

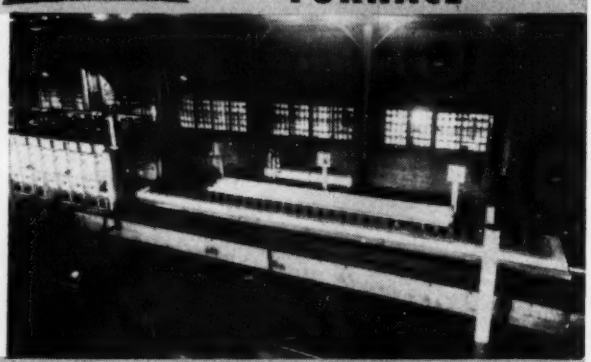
HAGAN *continuous automatic* HEAT TREATING FURNACE

HARDENS—DRAWS—STRESS-RELIEVES mixed products of variable sizes, weights and shapes with uniform results.

AUTOMATICALLY follows pre-determined heating, soaking, cooling cycle.

UNIFORM TEMPERATURE CONTROL lengthwise of furnace—accurately checked at up to 10 points in furnace.

SELF-CONTAINED car drive—Super-duty recirculating fans. Gas or oil fired.



HAGAN *automatic* CAR BOTTOM FURNACE

GEORGE J. HAGAN COMPANY

PITTSBURGH, PA.

DETROIT CHICAGO LOS ANGELES SAN FRANCISCO

Milling Fixture Design

(*Concluded from Page* 122)

this V-block contacts the workpiece this is moved backward and located between the surfaces of the contacts of the V-blocks.

A tool-setting gage of the correct thickness is now placed on the surface (N) and the table moved until the cutting surface of the milling cutter contacts the face of the gage. The machine is then started and the table carrying the fixture is fed under the revolving cutter and the desired surfaces milled.

To remove the finish machined piece it is only necessary to move the table, and therefore the fixture, out of the path of the milling cutter, move back screw (M) and the piece can be lifted out of milling fixture.

This fixture has many important features: It locates and holds the piece accurately and positively; it is easy to operate; the piece is placed and removed with a minimum of lost time or effort; with the adjustable locators the tool can be reset to meet changes in the contour of the casting or forging.

Gas Joining

(*Concluded from Page* 119)

a large evaporative condenser. When installed, the fan section will be assembled on top of a lower section.

Large pipe is used to fabricate shells, or cases for various kinds of condensers. Pipe is cut into desired lengths according to the size of condenser shell required. For this operation, an automatic oxyacetylene cutting torch is used to cut simultaneously and bevel the rim of the shell, as in Fig. 5, in which a 20-inch pipe is being cut. The jig fixture for this work is of unusual interest, in that the torch remains fixed, while the pipe is revolved at a controlled rate of speed. The torch is attached to the jig by a movable standard which can be placed at any desirable interval along the length of the pipe.

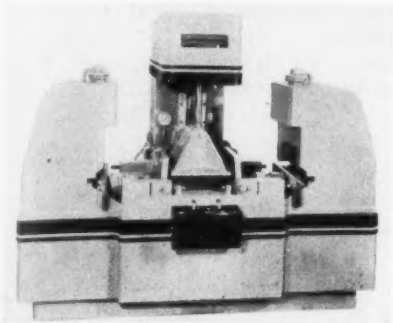
Holes are drilled in the cut tube sheet to provide outlets for the copper tubes extending the length of the shell in the Freon condenser construction. Tube ends are being silver-soldered into a ⅜-inch thick tube sheet. Silver solder No. 45 and Handy flux are used for this work at a temperature around 1175° F. Finished tube sheet end of a condenser is shown in Fig. 6. Tubes are silver-soldered in place, and face of the sheet treated with Heresite, a rust and corrosion-proof material.

From data presented by the author before the 50th anniversary convention of the International Acetylene Association, Detroit, May, 1948.

New Products and Equipment

Forming Machine

Three separate forming units are employed to perform three major bends in a shaping operation on an automatic machine made by Cyril Bath Co., 6972 Machinery Ave., Cleveland, O. The two outside heads contain forming slides which automatically and simultaneously form the curl and reverse lip of the extreme ends



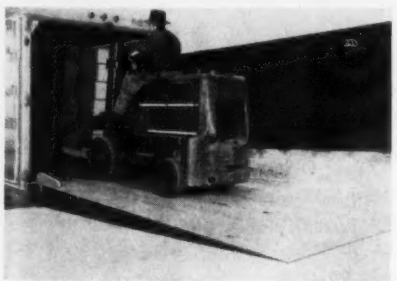
of the part. These slides actuate hydraulically, retract automatically and through sequence control, the center forming punch descends, making the two large radii bends with the assistance of wing type rocker plates.

Controls are provided and arranged so that the machine may be operated automatically or manually. Performing all three operations simultaneously, the machine produces about 40 cabinets per hour, made of cold rolled enameling steel of 18 and 20 gage.

Check No. 1 on Reply Card for more Details

Leveling Ramp

Loading and unloading of trucks and trailers, beds of which vary as much as 12 inches in height, are considerably eased with the Leva-Dock, a hinged platform supported by a hydraulic jack. Designed by Rotary



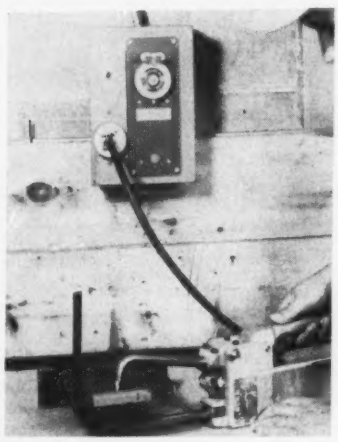
Lift Co., Memphis 2, Tenn., the ramp can be made to compensate for movement of the truck bed up or down as the loading or unloading takes place.

With the front end of the platform raised, the truck or trailer is backed into position and the platform lowered until the heavy supporting arms rest on the truck floor. The gap between the platform and the vehicle is bridged by a steel "throw-over" bridge. The hydraulic system is then released so that the front end of the platform is free to travel up or down with the truck bed as truck springs are relieved or compressed.

Check No. 2 on Reply Card for more Details

Welder Timer Control

Miller Electric Mfg. Co., Appleton, Wis., is announcing a model MSW timer control for use with their model MSW portable spot welder. Maximum efficiency, better and more uniform "spots", and increased tip life are advantages of the unit. The timer is



NEMA type 1A, 60 cycle, adjustable from 3 to 120 cycles (1/20 second to 2 seconds) and operates on either 110 or 220 volts. The cycle to be used is selected by adjusting a control on the case.

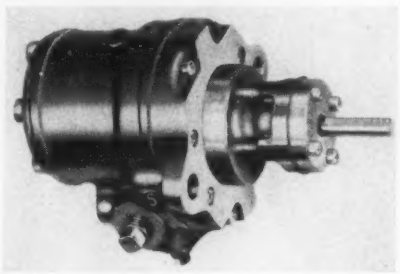
The timer is designed to mount on the wall or on a work bench. The spot welder plugs into a 4-prong, twist lock receptacle recessed in the front of the timer. Any Miller MSW portable spot welder now in use can, upon being returned to the factory, be adapted for use with the timer.

Check No. 3 on Reply Card for more Details

Small Capacity Pump

Polo Pump Co., Polo, Ill., is producing a gear pump suitable for supplying air or coolant, for hydraulic installations and for other uses where small capacities are required. The pump, designated as model 15, is designed for direct motor drive at 1725 revolutions per minute at pressures up to 150 pounds per square inch with a suction lift up to 25 inches of mercury.

It is furnished with or without built-in relief valve and strainer. Capacities are up to 50 gallons per hour. Heat treated shaved gears give

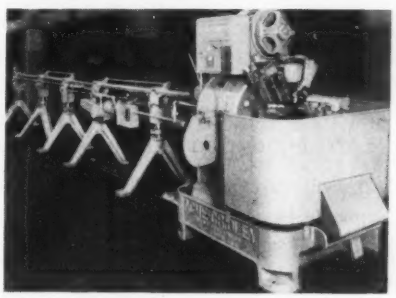


smooth and quiet operation. The pump body is cast iron with a chromium plated shaft in an extra long honed bearing. Shaft has a seal to prevent leakage.

Check No. 4 on Reply Card for more Details

Single Spindle Automatic

Designed for making parts from tubing where simple operations such as turning, forming, straight or taper boring and cut-off are required in mass quantities, the model SST single spindle automatic, made by National Acme Co., 170 East 131st St., Cleveland 8, O., is made in capacities up to 12 inches. Machine's heavy work spindle is supported in a double antifriction bearing at each end and is direct driven by sheaves, V-belt connected to motor. By changing sheaves, spindle speeds range from direct with an 1800 revolutions per minute motor down to 900 or with a



1200 revolutions per minute motor, down to 600.

Machines have no stock feed tubes, stock being fed by a cable, spring and pusher bar (on 2 and 3 inch capacity models) which are always under tension so that stock is fed the instant the collet opens. The 2 and 3-inch capacity machines are equipped with standard stock feed mechanism for tubing lengths up to 16

foundry
ventilating
with DRAVO
Counterflo
HEATERS
WARM AIR
OUTSIDE AIR
Here are some of the DRAVO features important in foundry heating and ventilating:
• Introduction of clean, tempered fresh air to replace exhausted air
• Heaters easily installed directly in working areas or connected to a distributing duct system
• Air-handling capacities ranging up to 22,000 CFM per unit
• Gas, oil, or combination burner systems for direct-firing in stainless steel combustion chambers

● When you establish comfortable working temperatures year round it's certain to show up in improved efficiency and higher morale among workers. In foundries or metal working shops, the reduction of smoke, fumes, and airborne dust by the introduction of clean, tempered fresh air is the first big step in establishing comfortable working conditions.

And you can accomplish these results quite readily by installing Dravo *Counterflo* Heaters. Characterized by their large air-handling capacity, and efficient method of air distribution, Dravo *Counterflo* Heaters are ideally suited for foundry ventilating during summer and winter seasons.

Dravo *Counterflo* Heaters can be shipped from stock so that you can take full advantage of the ventilating features during every season and have adequate heat available, instantly, when it's needed. Write or wire for descriptive Bulletin IJ-516.

Dravo also manufactures the *DRAVO CRANE CAB COOLER* for air conditioning hot-metal crane cabs.

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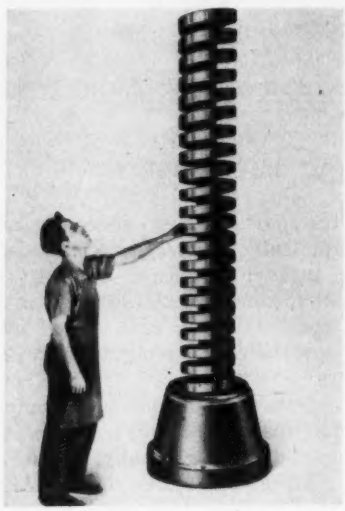
DRAVO

feet. The 6-inch capacity machines will handle a maximum stock length of 12 feet. Machines with capacities above 3 inches have an open type electric feed mechanism. Stock tubes are in half sections, opening up to receive stock which can be fed from a sloping table. The tube is manually closed and automatically locked. This loading method saves considerable time and floor space.

Check No. 5 on Reply Card for more Details

Vibratory Spiral Feeder

Various types of bulk materials may be elevated or lowered with the vibratory vertical spiral feeder developed by Syntron Co., 370 Lexington Ave., Homer City, Pa. High speed vibration causes the material



to flow up and around the ramp at rates controllable by a rheostat or reactor provided with each unit.

Feeders are available in limited heights and diameters. The maximum tonnage required determines the diameter of the spiral ramp. Units are available for operation from 110, 220 or 440 volt alternating current.

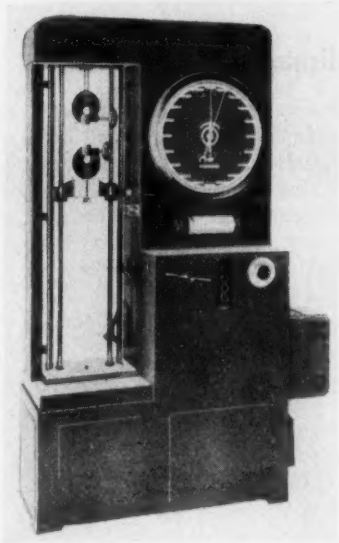
Check No. 6 on Reply Card for more Details

Testing Machine

Wide spread load ranges of 250 to 1, extension ranges of 200 to 1 and straining ranges of 400 to 1 are given by the Electromatic low capacity universal testing machine developed by Tinius Olsen Testing Machine Co., 1094 Easton Rd., Willow Grove, Pa. By applying the loads electronically an infinite variety of positive tests can be run.

Equipment consists of a weighing system for indicating and recording loads, two systems for indicating and recording extensions, and an electronic variable speed loading system

which provides positive strain rates. Weighing and extension systems have calibrations independent of their vacuum tube circuits and tubes. The weighing system electronically drives

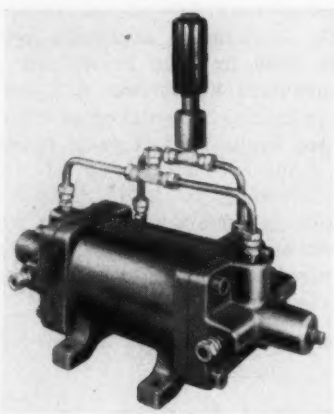


the load pointer and the recording pen and the internal and external strain units activate the recorder drum in direct proportion to specimen extension.

Check No. 7 on Reply Card for more Details

Pressure Intensifier

Now installed on all Hydrolair small hydraulic presses made by Elmes Engineering Works of American Steel Foundries, 1002 Fulton St., Chicago 7, Ill., is the Power-Petuator, an air actuated continuously charging intensifier. It provides continuous



high pressure stroke and maintains any desired preset ram pressure, even on compressible materials.

The completely automatic unit builds up working pressure virtually instantaneously when press controls are in "press" position. The self-contained unit is placed at the rear of the bench type presses and in the base

SCRUB... the AIR in your plant CLEAN

with Schmieg CENTRI MERGE Automatic DUST and FUME Eliminator

Dust and fumes don't get a chance to circulate in plants equipped with a Schmieg CENTRI-MERGE Eliminator. The moment dust or fumes develop from buffing, burring, grinding, polishing, curing or any other processing operation, they are swept up on an air stream that carries them back through ducts to a central Collection Unit. In the washing chamber of this Unit the CENTRI-MERGE high pressure centrifugal water action literally *scrubs* every last vestige of contamination from the air stream—cleans it so thoroughly that, in many cases, it can be recirculated back into the plant. That's why users are so enthusiastic about what CENTRI-MERGE accomplishes. Protects both workmen and work.

Consult Schmieg engineers regarding your problems of dust and fume control.

THE best AIR PURGE is CENTRI MERGE

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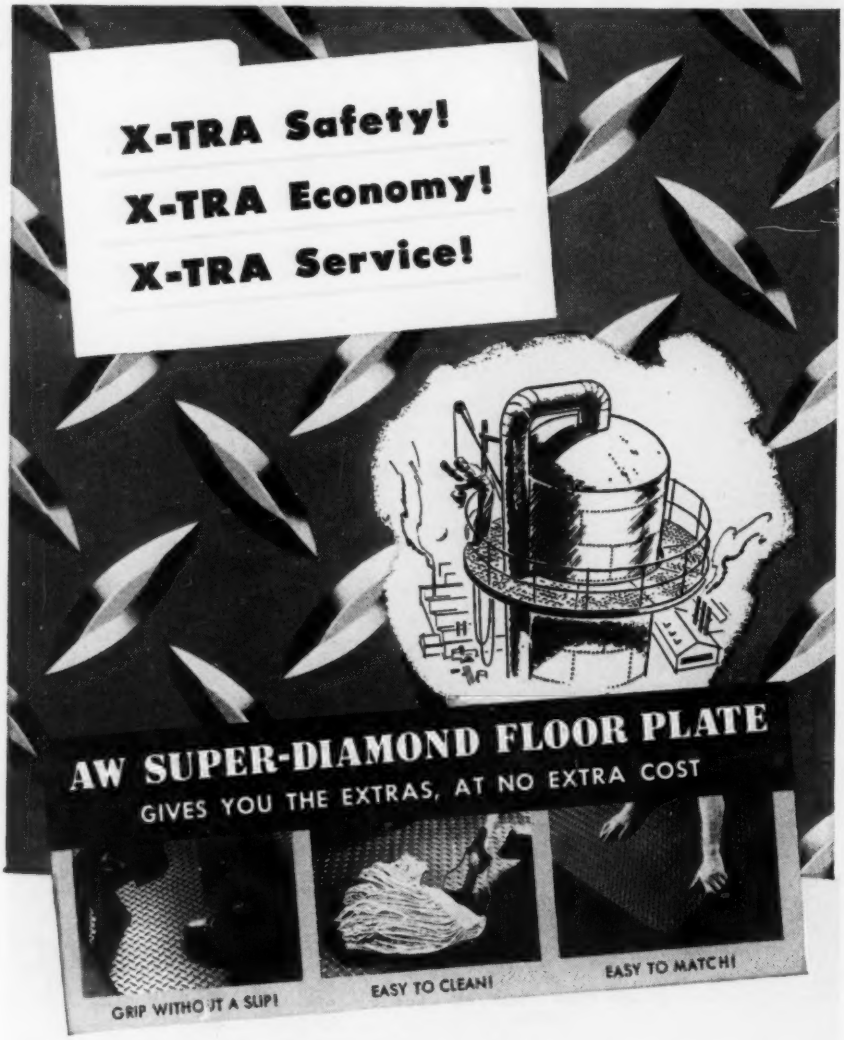

Want extra safe, extra strong, longer lasting fire escapes, loading platforms, running boards, machine tool bases, and trench covers? Then get AW Super-Diamond Floor Plate now. Its *exclusive* Super-Diamond Pattern makes it *extra safe;* wet or dry it grips, preventing costly accidents. It's *extra* economical —requiring no maintenance. Installation is permanent, and even the heaviest traffic doesn't damage it. Designers specify it for various products, and builders and architects use it for all types of construction. Get more information now.

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- AW Super-Diamond Floor Plate has over 1001 cost-saving uses on products and in plants. It will pay you to check your plant and products for possible applications.

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Alan Wood Steel Company, Conshohocken, Pa.

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A Product of **ALAN WOOD STEEL COMPANY**

Other Products: Billets • Plates • Sheets • Carbon & Alloy

of the floor types. Ram pressure is set by means of an air pressure regulating valve. Power is derived entirely from the shop air line.

Check No. 8 on Reply Card for more Details

Polishing Machine

Polishing, filing, burring and other similar operations on small parts may be performed by the polishing and finishing machine marketed by Brown & Sharpe Mfg. Co., Providence 1, R. I. It may be used for hand tooling, polishing threads of screws, removing cut-off teats and all burring operations necessary in connection with parts produced on automatic screw machines.

Height of the machine permits the operator to either sit or stand at work. It is driven at spindle speeds 2380, 3280 or 4500 revolutions per minute by a V-belt from a ½-horsepower motor. The control of the collet and brake by foot pedal provides for simultaneous opening of collet and stopping to load. Outside of spindle is threaded to take a small chuck or other fixtures. Collets can be furnished for stock from ⅛ to 1 inch in diameter.

Check No. 9 on Reply Card for more Details

Compound Applicator

Development of a roll coating machine for drawing compound by Bertsch Machinery Co., 2832 East Grand Blvd., Detroit 11, Mich., has made possible uniform application of the compound which prevents fracture or excessive strain marks on the part being drawn and which increases die life. One or both sides

Better plan your speech now for that 1958 Dinner

Ten years can be a mighty short span in the history of a business. *Yours* for example.

When the time comes to address your fellow executives at the "Annual Banquet" in 1958, will there be a decade of outstanding company progress for you to review?

One way to make sure of a prospering business tomorrow is to make certain *today* that your employees are buying U.S. Security Bonds regularly—on the Payroll Savings Plan. The Payroll Savings Plan is a "look-ahead" plan for both management and employees. It builds up an employee group with a sense of extra security...with a tangible stake in the nation's future...a group bound to shun dollar-destroying philosophies. At maturity, the Bonds pay $4 for every $3 invested.

P.S.P. is paying off *today*, for every Security Bond dollar built up in the Treasury retires a dollar of the national debt that is potentially inflationary. Records of the companies that actively maintain the Payroll Savings Plan show improved employee attitudes. Absenteeism and accidents have dropped as the individual's feeling of security grows with regular Bond buying.

The whole plan of action for use within your company has been mapped out. Just call your Treasury Department's State Director, Savings Bond Division.

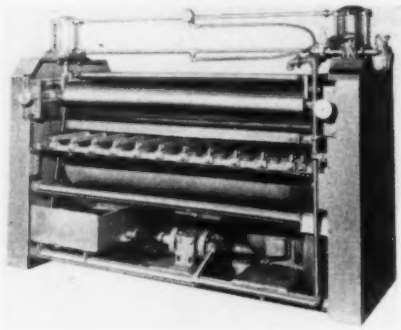
The Treasury Department acknowledges with appreciation the publication of this message by

STEEL

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and the Advertising Council.

of the blank may be coated simultaneously prior to insertion in the die cavity.

Compound may be applied in any desired quantity through the use of a controlled spreading roll. Almost



all types of compounds may be applied by the method. Sheets up to ¼-inch thick and of any length may be coated on these machines in widths ranging from 24 to 72 inches.

Check No. 10 on Reply Card for more Details

Salt Bath Unit

Undesirable phases of cyanide hardening are eliminated by the new continuous salt bath unit, made by Dempsey Industrial Furnace Corp., 133 Main St., Springfield, Mass., all units of which are totally enclosed to protect operator. All fumes are carried off by stacks without entering the room. The continuous salt bath heat treating unit, for use with neutral or cyanide type salts, is suited to hardening of small parts such as screws, bolts or screw machine parts.

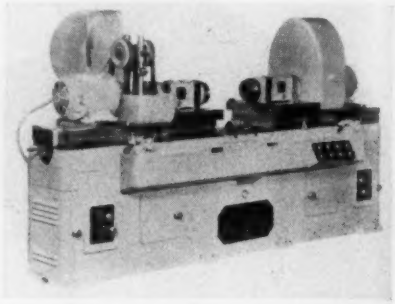
Unit consists of two pot type furnaces, a quench unit, a wash unit and a dryer. Automatic handling equipment, controlled manually but hydraulically operated, loads charge into salt baths and transfers work through quench, wash and dryer units, finally delivering it, clean and dry, into a transfer box. Charges range from 100 to 125 pounds and bath temperatures and heating cycle may be varied for each batch. Oil, gas or electricity may be used for heating.

Check No. 11 on Reply Card for more Details

Boring Machine

Simplex Machine Tool Division, Stokerunit Corp., Milwaukee, Wis., is producing a model 2UA precision boring machine which incorporates a sealed lubrication system in the precision boring heads, eliminating the entrance of foreign matter and resulting in cooler operation. A massive one-piece bed assures accuracy in boring and provides greater rigidity on heavy roughing operations.

Bridges are designed to permit greater use of multiple head installations. New coolant troughs give adequate protection even when the opera-



tions call for flooding the part with coolant. Unit type hydraulic systems isolate vibrations and heat from the machine proper. All hydraulic piping is manifolded to facilitate its removal for cleaning and servicing.

Check No. 12 on Reply Card for more Details

Worm Gear Drives

Both horizontal and vertical types of enclosed worm gear drives are included in the new line announced by Foote Bros. Gear & Machine Corp.,

ACCEPTED

BY AMERICA'S LARGEST INDUSTRIAL PLANTS TO DO THE TOUGHEST BLASTING AND PEENING OPERATIONS

HI-GRADE METALLIC

FAMOUS

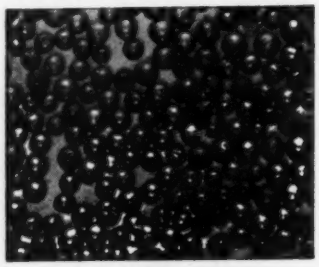
FOR ITS ABILITY TO STAND UP UNDER REPEATED HARD USE

SHOT

- ROUND
- UNIFORM IN SIZE
- UNIFORM IN HARDNESS
- LACKS IRREGULAR SHAPES

GRIT

- RECTANGULAR
- SHARP
- TOUGH
- DURABLE



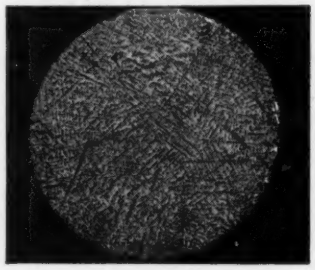
UNRETOUCHED PHOTO OF HI-GRADE SHOT

CLAYTON-SHERMAN ABRASIVES COMPANY

3896 LONYO ROAD

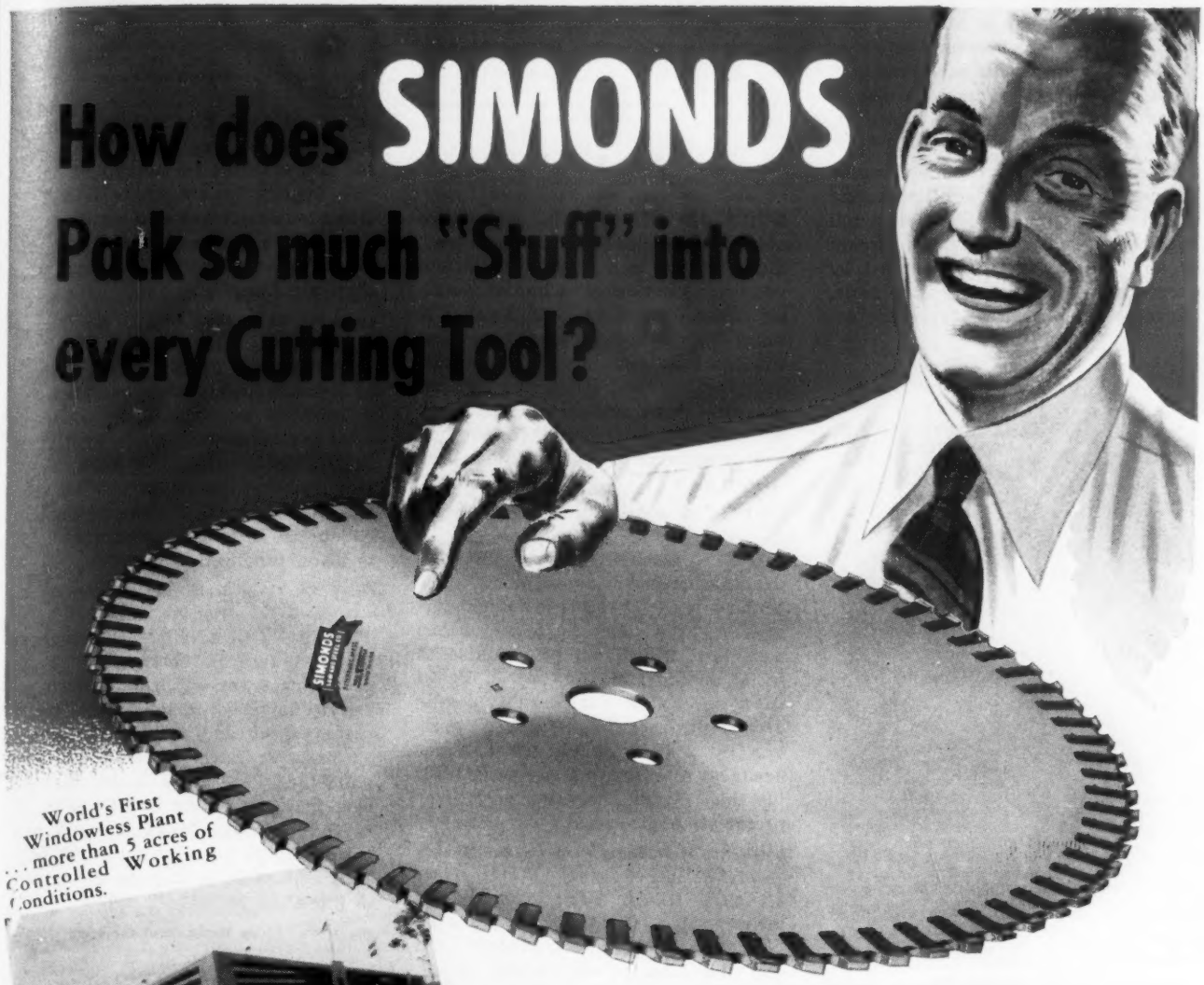
DETROIT 10, MICHIGAN

CEdar 7200



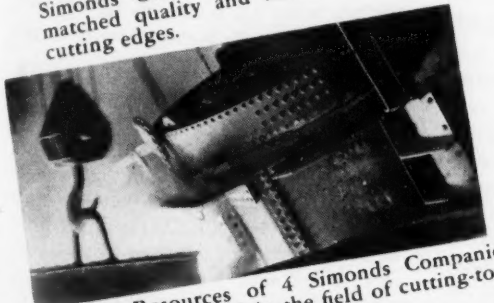
MICROSCOPIC STRUCTURE OF METAL

How does SIMONDS Pack so much "Stuff" into every Cutting Tool?



World's First Windowless Plant ... more than 5 acres of Controlled Working Conditions.

Simonds' Own Steel Mill guarantees the unmatched quality and uniformity of Simonds cutting edges.



Co-operative Resources of 4 Simonds Companies assure service unequalled in the field of cutting-tool manufacture.

Here are 6 Quick Answers

to this Often-Asked Question about SIMONDS SAWS, KNIVES and FILES

1. **Longest experience** . . . 115 years. Long experience per man . . . Simonds craftsmen *stay* with Simonds.
2. **World's First Windowless Plant** . . . air, light, sound completely controlled for better work, higher product-quality, faster delivery.
3. **Simonds Steel Mill** . . . Modern electric furnaces, under close laboratory control, pour all Simonds special cutting-tool steels.
4. **Simonds Own "Sharpeners"** . . . Simonds organization includes a top producer of grinding wheels . . . part of the secret of Simonds famous "Mirror Finish."
5. **Simonds Research:** New metals, methods, and cutting tools . . . these come *first* from Simonds.
6. **Simonds 4-Company Organization:** All quality controlled from raw material to *you.*

That's why Simonds Tools cut *your* cutting costs. Order from your Distributor.

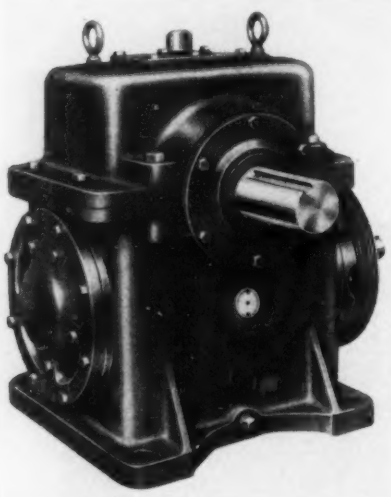
SIMONDS
SAW AND STEEL CO.
FITCHBURG, MASS.
Other Divisions of SIMONDS SAW AND STEEL CO. making Quality Products for Industry
SIMONDS STEEL MILLS
LOCKPORT, N. Y.
Special Electric Furnace Steels
SIMONDS ABRASIVE CO.
PHILADELPHIA, PA.
Grinding Wheels and Grains
SIMONDS CANADA SAW CO. LTD
Simonds Products for Canada

BRANCH OFFICES: 1350 Columbia Road, Boston 27, Mass.; 127 S. Green Street, Chicago 7, Ill.; 416 W. Eighth Street, Los Angeles 14, Calif.; 228 First Street, San Francisco 5, Calif.; 311 S. W. First Ave., Portland 4, Ore.; 31 W. Trent Ave., Spokane 8, Washington. *Canadian Factory:* 595 St. Remi St., Montreal 30, Que.

When you use SIMONDS You stay in the Highlands
OF CONSISTENT CUTTING EFFICIENCY

5225 South Western Blvd., Chicago 9, Ill. Delivering power at lower cost and having high thermal capacity, they permit use of a smaller reducer. A feature is an increased capacity accomplished by means of a new technique in generating gears.

Increased thermal capacity is due to the immersion in the oil reservoir of an air channel cylinder through which passes a high velocity stream of air. Oil leakage is prevented by use of carbon lapped ring type seals. Horizontal and vertical types are of-



fered in single and double worm gear reductions and in a wide range of standard ratios. Units comply with speed-ratio standards adopted by American Gear Manufacturers Association and National Electric Manufacturers Association.

Check No. 13 on Reply Card for more Details

Flame Spectrophotometer

Both qualitative and quantitative analyses of a large number of chemical elements is simplified with the Beckman flame spectrophotometer, announced by National Technical Laboratories, South Pasadena, Calif. Its use of hot flame is of particular value since it permits excitation of the spectral lines of a large number of elements, including many of the heavy metals and alkaline earths. Its spectral range covers ultraviolet, visible and near infrared spectral regions.

Samples are atomized and introduced at a uniform rate into a very hot oxygen and gas flame through a specially designed burner. The spectral emission lines of the elements are excited and the spectrophotometer isolates these lines and measures their intensities relative to a blank or standard. Only small samples are required. As they are atomized directly from external beakers, they can be analyzed very rapidly. Sensitivity is greater than 0.01 part per million.

Check No. 14 on Reply Card for more Details

• • •

METALLIC GASKETS: Fabricated of light gage brass, copper, lead, nickel, Monel and other ferrous and nonferrous materials, a line of metallic gaskets made by U. S. Gasket & Shim Co., Cuyahoga Falls, O., is filled with soft asbestos to provide maximum sealing and protection against pressure, heat and corrosion. They withstand temperatures to 850° F and pressures to 1500 pounds per square inch.

Check No. 15 on Reply Card for more Details

SAFETY GOGGLE: American Optical Co., Southbridge, Mass., announces a new head rest safety goggle for gas welders, burners, furnace men, etc., which can be adjusted to facial contours without tools. Based on a spring mechanism, the goggle can be thrown into "off-guard" position by a flick of the wrist. Fiber headgear fits comfortably and is adjustable. Goggle may be worn over prescription glasses.

Check No. 16 on Reply Card for more Details

INSERT ROLL DIE: Copper and brass pipe and tubing may be marked with the insert roll die, the Kop-R-Tube, made by M. E. Cunningham Co., 172 East Carson St., Pittsburgh, Pa. It can be furnished for use in marking machines or in standard coiling machines. It is grooved to suit size of tubing to be marked (¼-inch and larger) and is equipped with a recess slot for changeable marking die inserts.

Check No. 17 on Reply Card for more Details

PULLEY LAGGING: Applied without rivets, bolts or heat, a waterproof pulley lagging which dries in 10 hours at room temperature is announced by Condersite Engineering Corp., Philadelphia 3, Pa. The tough, wear resistant material adheres so firmly that a hammer and chisel are required to remove. Corrosion resistant, it is suitable for all types of pulleys.

Check No. 18 on Reply Card for more Details

STENCIL CUTTER: Circular as well as straight line stencils can be cut on the ½ and ⅞-inch housed model stencil cutting machines with an attachment made by Diagraph-Bradley Industries Inc., St. Louis 8, Mo. The smaller circular attachment will cut a maximum of six lines and the larger a maximum of four lines, both up to 21 inches in diameter.

Check No. 19 on Reply Card for more Details

HOSE CLAMP MACHINE: Developed by Punch-Lok Co., Chicago 7, Ill., is a machine for applying Punch-Lok clamps to air brake hose and other industrial hoses of smaller diameter. The self-contained unit is driven by compressed air from the shop air line.

Check No. 20 on Reply Card for more Details

INDUSTRIAL TIRE: Driver fatigue is lessened and vehicle maintenance is lessened with the U. S. Innacush solid industrial tire, made by United States Rubber Co., New York, N. Y. Designed for maximum traction, the tire has a soft inner construction and a tough, long wearing tread. It is being produced in 17 sizes.

Check No. 21 on Reply Card for more Details

THREAD CLEANER: Buckingham Mfg. Co. Inc., Binghamton, N. Y., is producing a thread cleaner which restores flattened, distorted or badly rusted right and left hand threads on bolts or studs up to 2 9/16-inch diameter. Operation is by slipping over bolt, tightening cutting jaws into the threads, closing the nut and turning until threader comes off bolt. It is applicable to threads of any size or pitch.

Check No. 22 on Reply Card for more Details

HYDRAULIC PUMP: Delivery of 1½-gallons of oil per minute and development of 1000 pounds per square inch pressure are features of the package type hydraulic power unit designed by Lyon-Raymond Corp., 5900 Madison St., Greene, N. Y. Furnished with all controls, the unit is powered by a ¾-horsepower 110, 220 or 440-volt motor.

Check No. 23 on Reply Card for more Details

GEARS, CRANE WHEELS: Line of Armored gears and crane wheels for various installations, produced by Pittsburgh Gear Co., Pittsburgh, Pa., is able to withstand more than average shock and wear. They have a reported service life of five times untreated gears.

Check No. 24 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Strip

Hot-Rolled Strip: 3.25c mill, except: 3.30c, Cleveland, Pittsburgh, Riverdale, Ill.; 3.25-3.35c,* Sharon, Pa.; 3.45c, Ecorse, Mich., Atlanta; 3.60c, Detroit; 3.70c, West Leechburg, Pa.; 4.00c, Pittsburg, Torrance, Calif.; 4.25c, Seattle, S. San Francisco, Los Angeles; 5.90c, Fontana, Calif.

* Wider than 6-in. and 6-in. and narrower, respectively.

Cold-Rolled Strip (0.25 carbon and less): 4.00c, mill, except 4.00-4.25c, Warren, O.; 4.20c, Ecorse, Mich.; 4.25c, Riverdale, Ill.; 4.40-4.50c, Detroit; 4.50c, New Haven, Conn., West Leechburg, New Castle, Pa., Boston; 4.75c, Dover, O.; 5.75c, Los Angeles; 7.10c, Fontana, Calif.

Cold-Rolled Alloy Strip: 9.50c, mill, except 9.80c, Worcester, Mass.

Cold-Finished Spring Steel: 0.26-0.40 C, 4.00c, mill, except: 4.30c, Worcester, Mass., 4.75c, Wallingford, Conn.; over 0.40 to 0.60 C, 5.50c, mill, except: 5.80c, Worcester, Mass., Wallingford, Conn.; over 0.60 to 0.80 C, 6.10c, mill, except: 6.40c, Worcester, Mass., Bristol, Wallingford, Conn.; over 0.80 to 1.05 C, 8.05c, mill, except: 8.35c, Worcester, Mass., Bristol, Conn.; over 1.05 to 1.35 C, 10.35c, mill, except: 10.30c, Wallingford, Conn., 10.65c, Worcester, Mass.

High-Strength, Low-Alloy Strip: Hot-rolled, 4.95c, mill, except: 5.25c, Ecorse, Mich., mill. Cold-rolled, 6.05c, mill, except: 6.35c, Ecorse, Mich., mill.

Tin, Terne Plate

Tin Plate: American Coke, per base box of 100 lb, 1.25 lb coating $6.60-$6.80; 1.50 lb coating $6.80-$7.00. Pittsburg, Calif., mill $7.35 and $7.55, respectively, for 1.25 and 1.50 lb coatings.

Electrolytic Tin Plate: Per base box of 100 lb. 0.25 lb tin, $5.80-$6.00; 0.50 lb tin, $6.00-$6.20; 0.75 lb tin, $6.20-$6.40.

Can Making Black Plate: Per base box of 100 lb. 55 to 70 lb basis weight, $5.20-$5.30; 75 to 95 lb basis weight, $5.10-$5.20; 100 to 128 lb basis weight, $5.20-$5.30. $5.75-$5.95, $5.65-$5.85, $5.75-$5.95, respectively, Pittsburg, Calif.

Holloware Enameling Black Plate: 29-gage, 4.75-4.95c per lb.

Manufacturing Ternes (Special Coated): Per base box of 100 lb, $5.90-$6.00.

Roofing Ternes: Per package 112 sheets; 20 x 28 in., coating I.C. 8-lb $15.50.

Plates

Carbon Steel Plates: 3.40c, mill, except: 3.40-3.60c, Cleveland; 3.45c, Sparrows Point, Md.; 3.60c, Pittsburgh, Aliquippa, Pa.; 3.65c, Ecorse, Mich.; 3.75c, Coatesville, Pa.; 3.81c, Torrance, Calif.; 3.95c, Claymont, Del., Conshohocken, Pa.; 4.80c, Seattle; 5.80c, Fontana, Calif.; 5.85c, Harrisburg, Pa.

Floor Plates: 4.55c, mill.

Open-Hearth Alloy Plates: 4.40c, mill, except: 5.10c, Coatesville, Pa., mill.

High-Strength, Low-Alloy Plates: 5.20c mill, except: 5.10c, Coatesville, Pa.; 5.30c, Conshohocken, Pa., Sparrows Point, Md., Johnstown, Pa.; 5.65c, Ecorse, Mich.

Shapes

Structural Shapes: 3.25c, mill, except 3.30c, Bethlehem, Pa., Lackawanna, N. Y., Johnstown, Aliquippa, Pa., 3.85c, Torrance, Calif.; 4.30c, Seattle, S. San Francisco, Los Angeles; 5.75c, Fontana, Calif.

Beams, Wide Flange: 3.20c, mill, except: 3.30c, Bethlehem, Aliquippa, Pa.

Alloy Structural Shapes: 4.05c, mill.

Steel Sheet Piling: 4.05c, mill.

High-Strength, Low-Alloy Shapes: 4.95c, mill, except: 5.05c, Bethlehem, Johnstown, Pa., Lackawanna, N. Y.

Wire and Wire Products

Wire to Manufacturers (carloads): Bright, Basic or Bessemer Wire, 4.15c, mill, except: 4.00c, Atlanta; 4.25c, Sparrows Point, Md., Kokomo, Ind.; 4.45c, Worcester, Mass.; 4.50c, Monessen, Pa.; 4.70c, Portsmouth, O.; 5.10c, Pittsburg, Calif.; 5.40c, Shelton, Conn. One producer quotes 4.50c, Chicago base; another, 4.50c, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Basic MB Spring Wire, 5.55c, mill, except: 5.30c, Portsmouth, O.; 5.65c, Sparrows Point, Md., Monessen, Pa.; 5.85c, Worcester, Mass., Trenton, N. J., 6.50c, Pittsburg, Calif., 5.30c, Portsmouth, O.

Upholstery Spring Wire, 5.20c mill, except: 5.30c, Sparrows Point, Md., Williamsport, Pa.; 5.50c, Worcester, Mass., Trenton, N. J., New Haven, Conn.; 6.15c, Pittsburg, Calif.

Wire Products to Trade (carloads): Merchant Quality Wire: Annealed (6 to 8 Gage base), 4.80c, mill, except: 4.90c, Sparrows Point, Md., 4.95c, Monessen, Pa.; 5.10c, Worcester, Mass.; 5.20c, Atlanta; 5.75c, Pittsburg, Calif. One producer quotes 5.15c, Chicago and Pittsburgh base; another, 5.20c, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Galvanized (6 to 8 Gage base), 5.25c, mill, except: 5.35c, Sparrows Point, Md.; 5.40c, Monessen, Pa.; 5.55c, Worcester, Mass.; 5.60c, Kokomo, Ind.; 5.65c, Atlanta; 6.20c, Pittsburg, Calif. One producer quotes 5.60c, Pittsburgh and Chicago base; another, 5.65c, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Nails and Staples: Standard, cement-coated and galvanized nails and polished and galvanized staples, Column 103, mill, except: 105, Sparrows Point, Md., Kokomo, Ind.; 109 Worcester, Mass.; 110 Atlanta; 117, Portsmouth, O.; 123, Pittsburg, Calif.; 124, Cleveland; 126, Monessen, Pa.; $5.20 per 100 pound keg, Aliquippa, Pa.; $6.75, Conshohocken, Pa., Wheeling, W. Va. One producer quotes column 109, Chicago and Pittsburgh base; another, column 113, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Woven Fence (9 to 15½ Gage, inclusive): Colmun 109, mill, except: 113 Monessen, Pa., Kokomo, Ind.; 121 Atlanta; 132, Pittsburg, Calif. One producer quotes column 113, Pittsburgh and Chicago base; another, column 114, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Barbed Wire: Column 123 mill, except: 125, Sparrows Point, Md., Kokomo, Ind.; 126 Atlanta; 128 Monessen, Pa.; 143, Pittsburg, Calif. One producer quotes 127, Chicago and Pittsburgh base.

Fence Posts (with clamps): Column 114, Duluth; 115, Johnstown, Pa.; 116, Moline, Ill.; $123.50 per net ton, Williamsport, Pa.

Bale Ties (single loop): Column 106, mill, except: 108, Sparrows Point, Md.; 110, Atlanta; 130, Pittsburg, Calif. One producer quotes column 115, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Tubular Goods

Standard Steel Pipe: Mill prices in carlots, threaded and coupled, to consumers about $200 a net ton.

	Butt Weld			Butt Weld	
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	41½	12½	1¼ ...	46½-	24-
¼	39½	14		49	32
⅜	36	9	1½ ...	47-	24½-
½	40½-	16½-		49½	32½
	43	24½	2	47½-	25-
¾	43½-	25½-		50	33
	46	28½	2½, 3..	48-	25½-
1	46-	23½-		50½	33½
	48½	31½	3½ & 4	44½	25

	Lap Weld		Elec. Weld		Seamless	
In.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
2	39½	20	38½	19	27-	7½-
					38½	19
2½ ..	42½-	23-	41½	22	32½-	13-
	43½	24			41½	22
3	42½-	23-	41½	22	35-	15½-
	43½	24			41½	22
3½ & 4	42½-	25-	43½	24	38½-	19-
	46½	27			43½	24
5 & 6.	42½-	23-	43½	24	38½-	19-
	44½	25			43½	24
7	....	..	....	..	43½	23

Line Steel Pipe: Mill prices in carlots to consumers about $200 a net ton.

	Butt Weld			Butt Weld	
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	40½	....	1¼ ...	47-	28-
¼	38½	....		48	29
⅜	35	....	1½ ...	47½-	28½-
½	41-	20½-		48½	29½
	42	21½	2	48-	29-
¾	44-	24½-		49	30
	45	25½	2½ & 3	48½-	29½-
1	46½-	27½-		49½	30½
	47½	28½	3½ & 4	43½	

	Lap Weld		Elec. Weld		Seamless	
In.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
2	38½	19	37½	18	26-	6½-
					37½	18
2½ ..	41½-	23	40½	..	31½-	12-
	42½				40½	21
3	41½-	23	40½	..	34-	14½-
	42½				40½	21
3½-4..	41½-	22-	42½	..	37½-	18-
	45½	26			42½	23
5 & 6.	41½-	22	42½	..	40½-	20-
	43½	..			44½	24
8	45½	..	44½	24	41½-	21-
10 ...	45	..	44	23	44	23½
12 ...	44	..	44½	..	40½-	20
					43	22½

Standard Wrought Iron Pipe: Mill price in carlots, threaded and coupled, to consumers about $200 a net ton.

	Butt Weld			Lap Weld	
In.	Blk.	Gal.	In.	Blk.	Gal.
⅜ ...	+59½	+85	1¼ ..	+22	+42½
½ ...	+20½	+42	1½ ..	+15½	+35
¾ ...	+10½	+31	2	+ 7½	+26
1 and			2½-3½	+ 5	+21.5
1¼	+ 4½	+22	4	List	+15½
1½ ..	— 1½	+18½	4½-8	+ 2	+17
2	— 2	+18	9-12	+12	+26½

Boiler Tubes: Net base c.l. prices, dollars per 100′, mill; minimum wall thickness, cut lengths 4 to 24″; inclusive.

		Seamless		Elec. Weld	
O.D. In.	B.W. Ga.	Hot Rolled	Cold Drawn	Hot Rolled	Cold Drawn
1	13	....	13.39	13.00	13.00
1¼	13	....	15.87	13.21	15.39
1½	13	$15.05	17.71	14.60	17.18
1¾	13	17.11	20.15	16.60	19.54
2	13	19.18	22.56	18.60	21.89
2¼	13	21.37	25.16	20.73	24.40
2½	12	23.54	27.70	22.83	26.88
2½	12	25.79	30.33	25.02	29.41
2¾	12	27.33	32.14	26.51	31.18
3	12	28.68	33.76	27.82	32.74
3¼	11	33.39	39.29	32.39	38.11
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78
4½	9	58.99	69.42	....	....
5	9	68.28	80.35	....	....
6	7	104.82	123.33	....	....

Rails, Supplies

Rails: Standard, over 60-lb: $3.20 per 100 lb, mill.

Light (billet): $3.55 per 100 lb, mill.

Light (rail steel): $4.70 per 100 lb., Williamsport, Pa.

Railroad Supplies: Track bolts, treated: $8.50 per 100 lb., mill. Untreated: $8.25, mill, except: $7.50, Fairfield, Ala.

Tie Plates: 4.05c mill, except: 4.20c, Pittsburg, Calif.; 4.50c, Seattle.

Splice Bars: 4.25c, mill.

Standard Spikes: 5.35c, mill, except: 5.25c, Pittsburgh.

Axles: 5.20c, mill.

Bolts, Nuts

Prices to consumers, f.o.b. midwestern plants. Sellers reserve right to meet competitors' prices, if lower. Additional discounts on carriage and machine bolts, 5 for carloads; 15 for full containers, except tire and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	35 off
⅝ and ⅝ x 6-in. and shorter	37 off
¾-in. and larger x 6-in. and shorter	34 off
All diameters longer than 6-in.	30 off
Tire bolts	25 off
Plow bolts	47 off
Lag bolts, 6 in. and shorter	37 off
Lag bolts, longer than 6 in.	35 off

Stove Bolts

In packages, nuts separate, 58½-10 off; bulk 70 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
⅞-in. and smaller	41 off	....
½-in. and smaller	....	38 off
½-in.-1-in.	39 off	....
⅝-in.-1-in.	....	37 off
1⅛-in.-1½-in.	37 off	35 off
1⅝-in. and larger	34 off	28 off

Additional discount of 15 for full containers.

Hexagon Cap Screws (Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright)	46 off
Upset (1035 heat treated)	
⅝ and smaller x 6 and shorter	40 off
¾, ⅞, & 1 x 6 and shorter	35 off

Square Head Set Screws

Upset 1-in. and smaller	51 off
Headless, ¼-in. and larger	31 off

Rivets

F.o.b. midwestern plants,

Structural ½-in. and larger	6.75c
⅞-in. and under	48 off

Washers, Wrought

Fob shipping point, to jobbers.....50c-$2 off

Tool Steels

Tool Steel: Cents per pound, producing plants; reg. carbon 19.00c; extra carbon 22.00c; special carbon 26.50c; oil-hardening 29.00c; high carbon-chromium 52.00c; chrome hot work, 29.00c.

W	Cr	V	Mo	Co	Base Per lb
18	4	1	...	...	90.50c
18	4	2	...	...	102.5c
18	4	3	...	...	114.5c
18	4	2	...	9	168.5c
1.5	4	1	8.5	...	65.00c
6.4	4.5	1.9	5	...	69.50c
6	4	3	6	...	88.00c

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax

Pig Iron

Per Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., furnace	$44.00	$44.50	$45.00	$45.50
Newark, N. J., del.	46.39	46.89	47.39	47.89
Brooklyn, N. Y., del.	....	48.40	48.90	....
Philadelphia, del.	46.17	46.67	47.17	47.67
Birmingham, furnace	42.88	43.38	....	....
Cincinnati, del.	....	49.09	....	....
Buffalo, furnace	44.00	44.00	44.50	45.00
Boston, del.	52.42	52.42	52.92	....
Rochester, del.	46.22	46.22	46.72	47.22
Syracuse, del.	47.025	47.025	47.525	48.025
Chicago, furnace	42.50-43.00	43.00-43.50	43.50	44.00
Milwaukee, del.	44.22-44.72	44.72-45.22	45.22	45.72
Muskegon, Mich., del.	....	49.65-50.15	50.15	....
Cleveland, furnace	43.00	43.50	43.50	44.00
Akron, del.	45.17	45.67	45.67	46.17
Duluth, furnace	43.00	43.50	44.00	44.50
Erie, Pa., furnace	42.50	43.00	43.50	44.00
Everett, Mass., furnace	....	48.75	49.25	....
Geneva, Utah, furnace	43.00	43.50	....	....
Seattle, Tacoma, Wash., del.	....	50.63	....	....
Portland, Oreg., del.	....	50.63	....	....
Los Angeles, San Francisco	50.13	50.63	....	....
Granite City, Ill., furnace	47.90	48.40	48.90	....
St. Louis, del.	48.65	49.15	49.65	....
Ironton, Utah, furnace	....	43.50	....	....
‡Neville Island, Pa., furnace	46.00	46.50	46.50	47.00
Pittsburgh, del., N.&S. Sides	47.08	47.58	47.58	48.08
Pittsburgh (Carnegie), furnaces	43.00	43.50	43.50	44.00
Sharpsville, Pa., furnace	43.00	43.50	43.50	44.00
Steelton, Pa., furnace	44.00	44.50	45.00	45.50
Struthers, O., furnace	42.50	....	....	....
Swedeland, Pa., furnace	50.00	50.50	51.00	....
Toledo, O., furnace	42.50	43.00	43.50	44.00
Cincinnati, del.	47.05	47.55	....	....
Youngstown, O., furnace	43.00	43.50	43.50	44.00
Mansfield, O.	46.87	47.37	47.37	47.87

‡ To Neville Island base add: $0.86 for McKees Rocks, Pa.; $1.31 Lawrenceville, Homestead, McKeesport, Monaco; $1.73 Verona; $1.94 Brackenridge; $1.08 to Ambridge and Aliquippa.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent Si (base)	$56.50		
6.51-7.00	57.75	9.01- 9.50	64.00
7.01-7.50	59.00	9.51-10.00	65.25
7.51-8.00	60.25	10.01-10.50	66.50
8.01-8.50	61.50	10.51-11.00	67.75
8.51-9.00	62.75	11.01-11.50	69.00

Fob Jackson, O., per gross ton. Buffalo furnace $1.25 higher.

Bessemer Ferrosilicon

Prices same as for blast furnace silvery iron, plus $1 per gross ton.

Electric Furnace Silvery Pig Iron Si 14.01-14.50%, $81.75 furnace, Niagara Falls; $81 open-hearth and $82 foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn. .....$62 (For higher silicon iron a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., $50. Philadelphia $52.81, delivered. Intermediate phosphorus, Central furnace, Cleveland, $48.00.

Differentials

Prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Fluorspar

Metallurgical grade, fob shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $35; less than 60% $32.

Metallurgical Coke

Price per Net Ton

Beehive Ovens

Connellsville, furnace	$13.50-15.50
Connellsville, foundry	16.00-18.00
New River, foundry	16.50
Wise county, foundry	15.35
Wise county, furnace	14.60

Oven Foundry Coke

Kearney, N. J., ovens	$21.50
Chicago, ovens	20.40
Terre Haute, ovens	21.00
Milwaukee, ovens	21.15
New England, del.	22.75
Birmingham, del.	17.86
Indianapolis, ovens	20.85
Cincinnati, del.	21.40
Ironton, O., ovens	18.25
Erie, Pa., del.	22.45
Painesville, O., ovens	20.90
Cleveland, del.	22.45
Buffalo, del.	23.10
Detroit, del.	21.65
Philadelphia, ovens	20.55
Swedeland, Pa., ovens	20.50
Portsmouth, O., ovens	19.25

Coal Chemicals

Spot, cents per gallon, ovens

(Price effective as of Aug. 5)

Pure benzol	20.00
Toluol, one degree	20.50-26.50
Toluol, two degrees	23.00-26.50
Industrial xylol	20.50-26.50

Per pound, ovens

Phenol, 40 (car lots, returnable drums)	13.00
Do., less than carlots	13.75
Do., tank cars	12.00
Naphthalene flakes, balls, bbl to jobbers, "household use"	12.00

Per ton, bulk, ovens

Sulphate of ammonia	$45.00

Refractories

(Prices per 1000 brick, fob plant)

Fire Clay Brick

Super Duty: St. Louis Vandalia, or Farber, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., $100.

High-Heat Duty: Salina, Pa., $85; Woodbridge, N. J., St. Louis, Farber, or Vandalia, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., $80.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, Haldeman, or Athens, Ky., Troup, Tex., Stevens Pottery, Ga., or Portsmouth, O., $74.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Pa., Bessemer, Ala., $66.

Ladle Brick

Dry Press: $55, Freeport, Merill Station, Clearfield, Pa.; Chester, New Cumberland, W. Va.; Irondale, Wellsville, O.; Goose Lake, Ill.

Wire Cut: $53, Chester, New Cumberland, W. Va.; Wellsville, O.

Malleable Bung Brick

St. Louis, Mo., Olive Hill, Ky., $83; Beach Creek, Pa., $73.

Silica Brick

Mt. Union, Claysburg, or Sproul, Pa., Ensley, Ala., $80; Hays, Pa. $85; Joliet or Rockdale, Ill., $89; Lehi, Utah, Los Angeles, $95.

Eastern Silica Coke Oven Shapes: Claysburg, Mt. Union, Sproul, Pa., $80.

Illinois Silica Coke Oven Shapes: Joliet or Rockdale, Ill., $81.

Basic Brick

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Chrome brick or chemical-bonded chrome brick, $69, magnesite brick, $91; chemical-bonded magnesite, $80.

Magnesite

(Base prices per net ton, fob works, Chewelah, Wash.)

Domestic dead-burned, ⅜" grains; Bulk, $31; single paper bags, $35.50.

Dolomite

(Base prices per net ton)

Domestic, dead-burned bulk: Billmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibonsburg, Woodville, O., $11.85; Thornton, McCook, Ill., $11.95; Dolly Siding, Bonne Terre, Mo., $12.05.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural) Lower Lake Ports

(Any increase or decrease in R. R. freight rates, dock handling charges and taxes thereon effective after Apr. 1, 1948, are for buyer's account.)

Old range bessemer	$6.60
Old range nonbessemer	6.45
Mesabi bessemer	6.35
Mesabi nonbessemer	6.20
High phosphorus	6.20

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56.62% contract	15.25

Foreign Ore

Cents per unit, cif Atlantic ports

Swedish basic, 60 to 68%	14.50
Brazil iron ore, 68-69%	18.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$26-$28

Manganese Ore

48-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 67.60c-72.60c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S.C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash. (S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$25.50-$26.00
45% no ratio	26.50
48% no ratio	29.00-30.00
50% no ratio	29.50-30.50
Brazilian—nominal	
44% to 2.5:1 lump	$33.65
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb., Mo., cont., Mines	$0.75

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

	SHEETS			STRIP		BARS				PLATES	
	H-R 10 Ga.	C-R 17 Ga.	Gal. *10 Ga.	†H-R	†C-R	H-R Rds. ⅜" to 3"	C-F Rds. ½" & up	H-R Alloy **4140	Standard Structural Shapes	Carbon ⅜"-¾"	Floor ¾" & Thicker
Boston (city)	5.84	6.64	7.84	6.04	6.90	5.69	6.39	8.24-9.74	5.54	5.89	7.34
Boston (c'try)	5.69	6.49	7.69	5.89	6.75	5.54	6.24	8.09-9.59	5.39	5.74	7.19
New York (city)	5.73-5.80	6.73	7.74-7.83	6.08-6.28	...	5.83	6.58	8.22	5.52-5.78	5.98	7.48
New York (c'try)	5.53-5.60	6.53	7.54-7.63	5.88-6.08	...	5.63	6.38	...	5.32-5.58	5.78	7.28
Phila. (city)	5.50-5.86	6.61-6.81	7.42-7.62	5.60-5.81	...	5.57-5.65	6.31	7.94	5.24-5.35	5.52-5.65	7.16
Phila. (c'try)	5.35-5.71	6.46-6.66	7.27-7.47	5.45-5.66	...	5.42-5.50	6.16	7.79	5.09-5.20	5.37-5.50	7.01
Balt. (city)	5.43†	6.33	7.53	5.49	...	5.54	...	...	5.48	5.68	7.13
Balt. (c'try)	5.28†	6.18	7.38	5.34	...	5.39	...	...	5.33	5.33	6.98
Norfolk, Va.	5.75	...	...	...	...	6.00	7.00	...	6.00	6.00	7.50
Buffalo (del.)	5.20-5.25	5.95-6.00	7.75	5.70	6.50	5.35	6.05	9.50	5.25	5.60	7.70
Buffalo (w'house)	5.05-5.10	5.80-5.85	7.60	5.55	6.35	5.20	5.90	9.40	5.10	5.45	7.55
Pitts (w'house)	4.85-5.00§	5.75-5.85‡	7.00-7.05	5.00-5.35	5.95-6.00	4.90-5.10	5.65	7.65	4.90-5.15	5.05-5.25	6.55
Detroit (w'house)	5.40§	6.30	7.60	5.40	...	5.45	6.17	8.12	5.45	5.65	7.10
Cleveland (del.)	5.13-5.29	6.00-6.29	7.34-7.49	5.17-5.69	6.80	5.30-5.34	6.05-6.10	7.94-8.29	5.34-5.60	5.50-5.54	6.95-6.99
Cleveland (w'hse)	4.98-5.75	5.75-6.14	7.19-7.85	5.02-5.54	6.40	5.15-5.19	5.90-5.95	7.79-8.14	5.19-5.45	5.35-5.39	6.80-6.84
Cincinnati (w'hse)	5.26	6.11	7.60	5.52	6.07	5.52	6.07	...	5.37	5.61	6.91
Chicago (city)	5.20	5.90†‡	7.20	5.00	6.30	5.05	5.85	7.80[9]	5.05	5.25	6.70
Chicago (w'house)	5.05	5.75†‡	7.05	4.85	6.15	4.90	5.70	7.65[9]	4.90	5.10	6.55
Milwaukee (city)	5.37	6.07+‡	7.37	5.17	6.47	5.22	6.02	7.97[9]	5.22	5.42	6.87
St. Louis (del.)	5.34§	6.24‡	7.44	5.34	6.64	5.39	6.19[12]	6.64	5.39	5.59	7.04
St. Louis (w'hse)	5.19§	6.09‡	7.29	5.19	6.49	5.24	6.04[13]	9.49	5.24	5.44	6.89
Birm'ham (city)	5.20§	...	6.60	5.20	...	5.15	6.66	...	5.15	5.40	7.41
Birm'ham (c'try)	5.05§	...	6.45	5.05	...	5.00	6.51	...	5.00	5.25	7.26
Omaha, Nebr.	6.07	...	9.33	6.07	...	6.12	6.92	...	6.12	6.32	7.77
Los Angeles (city)	6.55§	8.05	8.20†	6.75	9.50	6.20	8.00-8.50	...	6.70	6.40	8.15
Los Angeles (w'house)	6.40§	7.90	8.05†	6.60	9.35	6.05	7.85-8.35	...	6.55	6.25	8.00
Seattle-Tacoma	6.35[17]	7.90‡	8.40	6.70[17]	...	6.20[17]	8.15[1]	9.45[2]	6.30[17]	6.35[17]	8.40[17]

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [3]—450 to 39,999 lb; [4]—three to 24 bundles; [5]—450 to 1499 lb; [6]—400 to 14,999 lb; [8]—400 to 1499 lb; [9]—1000 to 1999 lb; [11]—1000 to 39,999 lb; [12]—1000 lb and over; [13]—2000 lb and over; [17]—300 to 9999 lb; [18]—1500 to 1999 lb; [19]—1500 to 39,999 lb; [20]—400 to 3999 lb; [21]—400 lb and over; [22]—500 to 1499 lb; [23]—Price (but not other price in range) applies to any and all quantities.

* Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; § 18 gage and heavier; ** as rolled; †† add 0.40 for sizes not rolled in Birmingham.

PRICES OF LEADING FERROALLOYS PRODUCTS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si) Carlot per gross ton, $57, Palmerton, Pa., $56, Pittsburgh and Chicago; (16% to 19% Mn.) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.). Carload, lump, bulk $160 per gross ton of alloy, Alloy, W. Va., Welland Ont., Sheridan, Pa., and Lynchburg, Va.; $147 Johnstown, Pa., mill. Carload, lump, bulk, $150 fob Rockwood, Tenn.; $148 fob Aetna, Pa. Add or subtract $1.80 for each 1%, or fraction thereof, of contained manganese over 82% or under 78%. West Coast Prices: Carload (80,000 lb or more), lump, bulk, same price and basing points as above. All other prices for shipment from Pacific Coast warehouses, add $26.21 to above prices. Delivery is fob Portland, Los Angeles, South San Francisco, or Seattle warehouses, with freight allowed on shipments of 25 gross tons or more.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Eastern Zone, carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.80c; Central, add 0.3c for c.l. and 1.1c for l.c.l. Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%. C 1.5% max., Si 1.5% max.). Eastern Zone, carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20c, less ton 21.2c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Eastern Zone, carload, 2" x D, bulk 35c per lb of metal, carload packed 35.5c, ton lot 37c, less ton 39c; Central, add 1c for c.l. and 1.45c for l.c.l.; Western, add 1.45c for c.l. and 2.4c for l.c.l. Freight allowed. Spot, add 2c.

Silicomanganese: (Mn 65-70%). Eastern Zone, contract, lump, bulk, 1.50% C grade, 17-20% Si, 8.6c per lb of alloy, carload packed, 9.35c, ton lot 10.25c, less ton 11.25c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. For 2.0% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Eastern Zone, contract, c.l. lump, bulk 20.5c per lb of contained Cr, c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

> Quotations on ferroalloys include advances scheduled to become effective Oct. 1 and which are detailed in the article appearing on page 177 of this issue. For prices on these products prevailing currently and until effective date of the increases, refer to page 155 of the Sept. 6 issue of STEEL.

Low-Carbon Ferrochrome: (Cr 67-72%). Eastern Zone, contract, carload, lump, bulk, max. 0.03% C 30.75c per lb of contained Cr, 0.04% C 29.75c, 0.05% C 29.25c, 0.06% C 28.75c, 0.10% C 28.25c, 0.15% C 28c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 2% C 27c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, add C 1.25% max.). Eastern Zone, contract, carload, lump, bulk 25c per lb of contained chromium, carload, packed 26.1c, ton lot 27.3c, less ton 29.1c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

Chromium Metal: (Mn 97% Cr and 1% Fe). Eastern Zone, contract, carload, 1" x D; packed, max. 0.50% C grade, $1.03 per lb of contained chromium, ton lot $1.045 less ton $1.07; Central, add 1.5c, for c.l. and 2.5c for l.c.l.; Western, add 2.75c for c.l. and 4.5c for l.c.l. Freight allowed. Spot, add 5c.

SILICON ALLOYS

20-30% Ferrosilicon: Contract, carload, lump, bulk, 16.50c per lb of contained Si, fob Niagara Falls, N. Y.

50% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 10.5c per lb of contained Si, carload packed 12.1c; ton lot 13.55c, less ton 14.0c; Central, add 0.5c for c.l. and 1.25c for l.c.l.; Western, add 0.7c, for c.l. and 1.8c for l.c.l. Freight allowed. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 13c per lb of contained Si carload packed 14.3c, ton lot 15.45c, less ton 16.7c; Central, add 0.3c for c.l. and 0.75c for l.c.l.; Western, add 1.05c for c.l. and 5c for l.c.l. Freight allowed. Spot, add 0.3c.

85% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 14.65c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c; Central, add 0.3c for c.l. and 0.7c for l.c.l.; Western, add 1.05c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 18.2c; Central, add 0.3c for c.l. and 0.65c for l.c.l.; Western, add 1c for c.l. and 4e for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Over 97% Si and 1% max. Fe.) Eastern Zone c.l., lump, bulk, regular 19c per lb of Si, c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c; Central, add 0.6c for c.l. and 2.25c for l.c.l.; Western, add 1.2c for c.l. and 4c for l.c.l. Add 1c for max. 0.20% calcium grade. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing over 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract basis fob Niagara Falls, N. Y., lump per lb cl 6.90c; ton lots packed, 7.40c; 200 to 1999 lb, 8.15c smaller lots 8.65c. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3% lb each and containing exactly 2 lb of Cr). Eastern Zone, contract, carload, bulk, 13.75c per lb or briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c; Central, add 0.25c for

(*Please turn to Page* 186)

Brass Ingot Price Tone Eases

Decline in new orders for ingot weakens price structure, although only one leading producer reduces prices. Primary metal markets remain strong with supplies tight

New York—Reopening of metal sales offices following the Labor Day holiday found the supply-demand situation unchanged. Producers were booking October business in copper, lead and zinc cautiously since they do not have sufficient supplies on hand or in sight to meet continuing active demand. A slightly easier tone developed in brass ingot, however, reflecting a decline in demand but, with one exception, leading sellers held prices unchanged.

Copper—Interests in the copper market continued to discuss Secretary of Commerce Sawyer's recent review of the supply situation. He said that total demand for copper for fiscal 1949, excluding stockpiling, was 1,380,000 tons and that the net available supply would be 1,280,000 tons, leaving a deficit of 100,000 tons. In view of this official evaluation of the market, consumers were concerned with the probability that the Munitions Board's future policy in regard to stockpiling will be one giving less consideration to the effect of heavy purchases of copper on domestic consumers than existed previously. In view of the constantly rising operating costs, it is doubtful if the present 23.50-cent price will bring out any appreciable additional amount of copper.

Stringency in supplies will be aggravated over the balance of this year by requirements of the Economic Co-operation Administration. ECA has reported that new procurement authorizations as of Sept. 3 included the following:

Copper to be shipped from Belgium to the French zone, value $623,000; copper (oxygen-free, high-conductivity) to be shipped from the United States to France, value $418,000; copper (oxygen-free, high-conductivity) special shape wire bars, to be shipped from Canada to France, value $825,000; electrolytic copper in wire bars and other forms to be shipped from Chile to France, value $1,420,000; electrolytic copper (cathodes, ingots or bars) to be shipped from Chile to Italy, value $2,900,000.

The primary market remained unchanged with electrolytic quoted 23.50c, delivered Connecticut Valley.

Brass and Bronze Ingots—A decline in new orders for brass and bronze ingots which was noticeable during the last two weeks of August culminated last week in a price cut by one leading producer. This move was not followed, however, by other leading interests. It was pointed out that the decline in new business, if continued, would cause ingot makers to curtail their purchases of scrap, although most interests were buying scrap last week on a limited scale.

White Bros. Smelting Corp., Philadelphia, reduced prices ¼-cent a pound on Navy-M ingot and yellow ingot No. 405 and ½-cent a pound on ingots No. 115, 120 and 123. While this company quotes prices fob shipping point basis, it is believed that the delivered prices would be considerably below those quoted by other leading makers who quote on the latter basis.

Lead—Due chiefly to the prolonged strike at the southeastern Missouri properties of the St. Joseph Lead Co., which started July 7, the stringency in lead supplies is becoming increasingly serious. As a result of this strike, receipts of domestic lead in ore by smelters during July were off about 10,100 tons to 24,597 tons, the smallest tonnage reported since June, 1946, according to the American Bureau of Metal Statistics. Total receipts of lead in ore and scrap during July amounted to 33,332 tons, compared with 44,858 tons in June. Total receipts in the first seven months of 1948 amounted to 295,088 tons, compared with 311,815 tons in the like period a year ago.

Receipts of lead in scrap declined to 2388 tons from 2866 tons in the preceding month while receipts of foreign lead in ore dropped to 6347 tons from 7303 tons in June.

Prices held unchanged last week at 19.30c to 19.35c, St. Louis, for the common grade.

Zinc—The labor picture in the zinc industry was a little brighter last week, following the signing of a contract between the Union of Mine, Mill & Smelter Workers (CIO) and the Eagle-Picher Mining & Smelting Co. This contract ended a strike which had paralyzed production of zinc and lead concentrates in the Tri-State district since July 1. It is estimated that about 15,000 tons of zinc concentrates and 3000 tons of lead concentrates were lost, including tonnage lost by about 20 companies which ship ore to the Central mill. Settlement of the Eagle-Picher strike is expected to facilitate negotiations now under way to end the strikes at properties of American Zinc, Lead & Smelting Co. and Athletic Mining & Smelting Co.

Eagle-Picher Mining & Smelting Co. has purchased the government-owned smelter at Henryetta, Okla., for $80,000. The plant had been operated on a lease arrangement by Eagle-Picher since June 24, 1942. Original cost of the plant was about $150,000.

Tin—Shipments of Straits tin amounted to 4419 tons in August, of which 1615 tons were from Singapore and 2804 tons from Penang. Disposition of the August metal in tons was as follows: To the United States, 2900; continental Europe, 865; Canada, 400; United Kingdom, 155; Australasia, 35; South Africa, 30; Pacific areas, 30; and South America, 4. Shipments of Straits tin for the eight months ended Aug. 31 came to 31,689 tons, of which the United States received 20,550 tons; continental Europe, 4744 tons; India, 2480 tons; and Canada, 2155 tons.

Aluminum—L. E. Batten, Nichols Wire & Aluminum Co., Davenport, Iowa, was quoted by the Bulletin of the National Association of Purchasing Agents as follows:

"By this time, undoubtedly, all users of aluminum in every form have felt the pinch of the shortage of this metal. Prospects are that it will continue to get still worse for the balance of this year, with nothing in sight to indicate relief ahead.

"The postwar demand for this light metal has grown by leaps and bounds and, while the producers have continued to improve their finishing capacities, they are handicapped by the lack of base metal with which to operate. Immediately after the war, they depended a good deal on secondary aluminum, which is remelted from scrap. This does not require anywhere near the amount of power to remelt that is needed to produce from bauxite. Scrap has now become in such short supply that the mills are faced with further cutbacks in production.

"On the other hand, the demand for aluminum is increasing for replacing such materials as steel, copper, wood, etc., in a good many instances. Today, aluminum is being used for castings, windows and screens, roofing, nails, clothesline, insulating materials, electrical wiring, foil for wrapping food products and cigarettes, automobile parts, as well as railroad cars, and many other end uses.

"The only solution seems to be in additional electrical generating capacity as the supply of bauxite is ample."

Silver—Prices in the silver market have advanced steadily during the past two weeks, being quoted 75.25c toward the close of last week compared with 72.75c on Aug. 25. This strength is attributed to the decision of the Bank of Mexico to increase by 50 per cent the minting of five-peso coins which would take practically all of its present output of silver each month. This factor was coupled with the stoppage of shipments by producers pending clarification of the 15 per cent tax on exports.

Wrought Aluminum Shipments

Washington—Shipments of aluminum wrought products during July amounted to 131 million lb, according to Census Bureau, Commerce Department, 8 per cent under the 142 million lb shipped in June. Part of this decline may be traced to seasonal changes, as the month's aggregate was 43 per cent higher than the same month in 1947. Decrease in shipments for the month reported was accounted for principally by shipments of plate, sheet and strip which dropped to 99 million lb from 107 million lb shipped in June. Total shipments for the first 7 months of 1948 add up to 980 million lb, considerably above the 768 million lb shipped during the same period of 1947.

NONFERROUS METAL PRICES

(Cents per pound, carlots, except as otherwise noted)

Copper: Electrolytic, 23.50c, Conn. Valley; Lake, 23.62½ Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 22.00c; 88-10-2 (No. 215) 31.00c; 80-10-10 (No. 305) 27.25c; No. 1 yellow (No. 405) 17.50c.

Zinc: Prime western 15.00c, brass special 15.25c, intermediate 15.50c, East St. Louis; high grade 16.00c, delivered.

Lead: Common 19.30-19.35c chemical and corroding 19.40c, St. Louis.

Primary Aluminum: 99% plus, ingots 16.00-17.00c, pigs, 15.00-16.00c. Base prices for 10,000 lb and over, fob shipping point, freight allowed.

Secondary Aluminum: Piston alloy (No. 122 type) 24.00-24.75c; No. 12 foundry alloy (No. 2 grade) 23.50-24.00c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 25.25-25.75c; grade 2, 24.50-25.00c; grade 3, 24.00-24.75c; grade 4, 23.50-24.25c. Prices include freight at carload rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, fob Freeport, Tex.

Tin: Grade A, 99.8% or higher (including Straits) $1.03; grade B, 99.8% or higher, not meeting specifications for grade A, with 0.05% max. arsenic, $1.023; grade C, 99.65-99.79%, incl., $1.024; 99.5-99.649% $1.024, grade F, 98-98.999% $1.015 for tin content. Prices are ex-dock, New York, in 5-ton lots.

Antimony: American 99-99.8% and over but not meeting specifications below, 35.00c; 99.8% and over (arsenic 0.05% max.; other impurities, 0.1% max.) 35.50c, fob Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00c; 25-lb pigs, 42.50c; shot nom.; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 40.50c. Prices include import duty.

Mercury: Open market, spot, New York $75-$77 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $20.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $1.90, del.; special or patented shapes, $2.

Cobalt: 97-98%, $1.65 per lb for 550 lb (keg); $1.67 per lb for 100 lb (case); $1.72 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 75.25c per ounce.

Platinum: $93-$96 per ounce.

Palladium: $24 per troy ounce.

Iridium: $110-$120 per troy ounce.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, fob mill)

Sheet: Copper 37.18; yellow brass 33.75; commercial bronze, 95%, 37.11; 90%, 36.63; red brass, 85%, 35.64; 80%, 35.16; best quality 34.63; nickel silver, 18%, 46.41; phosphor-bronze, grade A, 5%, 56.05.

Rods: Copper, hot rolled 33.03; cold drawn 34.28; yellow brass, free cutting, 33.44; commercial bronze, 95% 36.80; 90% 36.32; red brass, 85% 35.33; 80% 34.85.

Seamless Tubing: Copper 37.22; yellow brass 36.76; commercial bronze 90% 39.29; red brass 85% 38.55; 80% 38.07.

Wire: Yellow brass 34.04; commercial bronze, 95% 37.40; 90% 36.92; red brass, 85% 35.93, 80% 35.45; best quality brass 34.92.

Copper Wire: Bare, soft, fob eastern mills, c.l. 29.42½c, l.c.l. 29.92½-30.05c; weatherproof, fob eastern mills, c.l. 29.60-29.85c, l.c.l. 30.35c; magnet, delivered, c.l. 32.75-33.50c, 15,000 lb or more 33.00-33.75c, l.c.l. 33.50-34.25c.

ALUMINUM

Sheets and Circles: 2c and 3c mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	25.9	...	...
0.135-0.096	12-48	26.4	...	...
0.095-0.077	12-48	26.9	25.0	28.6
0.076-0.068	12-48	27.5	25.2	28.8
0.067-0.061	12-48	27.5	25.2	28.8
0.060-0.048	12-48	27.7	25.4	29.1
0.047-0.043	12-48	28.1	25.6	29.4
0.042-0.038	12-48	28.1	25.6	29.4
0.037-0.030	12-48	28.5	26.0	29.9
0.029-0.024	12-48	28.9	26.3	30.3
0.023-0.019	12-36	29.5	26.7	30.8
0.018-0.017	12-36	30.1	27.3	31.6
0.016-0.015	12-36	30.8	27.9	32.5
0.014	12-24	31.7	28.7	33.6
0.013-0.012	12-24	32.6	29.4	34.5
0.011	12-24	33.6	30.3	35.7
0.010-0.0095	12-24	34.6	31.3	37.0
0.009-0.0085	12-20	35.8	32.4	38.5
0.008-0.0075	12.20	37.1	33.6	40.1
0.007	12-18	38.5	34.9	41.9
0.006	12-18	40.0	36.2	46.0

*** Minimum length, 60 inches. † Maximum diameter, 24 inches.**

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T	—Round— 17S-T	—Hexagonal— R317-T	—Hexagonal— 17S-T
0.125	45.0	47.0	...	...
0.156-0.203	38.5	40.0	...	...
0.219-0.313	35.5	37.0	...	...
0.344	34.0	36.00	...	...
0.375	33.0	35.5	42.5	43.0
0.406	33.0	35.5	...	...
0.438	33.0	35.5	42.5	43.0
0.469	33.0	35.5	...	...
0.500	33.0	35.5	42.5	43.0
0.531	33.0	35.5	...	...
0.563	33.0	35.5	40.5	40.5
0.594	33.0	34.5	...	...
0.625	33.0	35.5	40.5	40.5
0.656	33.0	35.5	...	...
0.688	33.0	35.5	40.5	40.5
0.750-1.000	32.0	34.5	37.0	38.0
1.063	32.0	34.5	35.5	36.5
1.125-1.500	31.0	33.5	35.5	36.5
1.563	31.0	33.5	...	35.5
1.625	30.0	32.5	34.5	35.5
1.688-2.000	30.0	32.5	...	...
2.125-2.500	29.5	31.5	...	...
2.625-3.375	28.5	30.5	...	...

LEAD

(Prices to jobbers, fob Cleveland, Pittsburgh)

Sheets: Full rolls, 140 sq ft or more, $23.25 per cwt.; add 50c per cwt., 10 sq ft to 140 sq ft; $1.25, less than 10 sq ft; $1, circles and segments. Pipe: Full coils, $22.50 per cwt; cut coils, $22.75. Traps and Bends: List price plus 70%.

ZINC

Sheets, 19.50-20.00c, fob mill, 36.00 lb and over. Ribbon zinc in coils, 18.25c-19.00c, fob mill, 36,000 lb and over. Plates, not over 12-in., 17.25c; over 12-in., 18.25c.

NICKEL

(Base prices, fob mill.)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, fob mill.)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c. Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb. 35.00-36.00c.

Plating Materials

Chromic Acid: 99.9%, flake, fob Philadelphia, carloads, 26.00c; 5 tons and over 26.50c; 1 to 5 tons, 27.00c; less than 1 ton, 27.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 33.84c; oval 33.34c; electrodeposited, 31.09c; cast, 30.12c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 46.00c, fob Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 16.00c; 1000 to 19,900 lb, 15.00c, fob Niagara Falls, N. Y.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 26.25c; over 250 lb, 25.25c, fob Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00c; under 100 lb, 64.00c; fob Cleveland. Add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 26.50c; 275-lb, or 500-lb bbl, 24.50c, fob Cleveland.

Tin Anodes: Bar, 1000 lb and over 119.00c; 500 to 999 lb, 119.50c; 200 to 499 lb, 120.00c; less than 200 lb. 121.50c; ball, 1000 lb and over, 121.25c; 500 to 999 lb 121.75c; 200 to 499 lb, 122.25c; less than 200 lb, 123.75c, fob Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 71.8c; 100 or 300 lb drums only, 100 to 500 lb, 63.6c; 600 to 1900 lb, 61.2c; 2000 to 9900 lb, 59.4c. Prices fob Sewaren, N. J.

Zinc Cyanide: 100-lb drums 39.25c, fob Cleveland; 39.00c, Detroit; 38.00c, fob Philadelphia.

Stannous Sulphate: Less than 2000 lb, in 100 lb kegs, 100.00c, in 400 lb bbl. 99.00c; more than 2000 lb, in 100 lb kegs, 99.00c, in 400 lb bbl, 98.00c.

Scrap Metals

BRASS MILL ALLOWANCES

(Based on 23.50c, Conn., for copper)

Prices in cents per pound for less than 15,000 lb fob shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.125	21.125	20.375
Yellow brass	18.000	17.750	17.125
Commercial Bronze			
95%	20.125	19.875	19.375
90%	19.750	19.500	19.000
Red brass			
85%	19.750	19.500	19.000
80%	19.500	19.250	18.750
Best Quality (71-79%)	19.000	18.750	18.250
Muntz Metal	17.250	17.000	16.500
Nickel, silver, 10%	19.625	19.375	9.813
Phos. bronze, A.	22.625	22.375	21.375
Naval brass	17.750	17.500	17.000
Manganese bronze	17.750	17.500	16.875

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 19.50, No. 2 copper 18.50, light copper 17.50, composition red brass 16.25-16.50, auto radiators 13.50, heavy yellow brass 11.75-12.00, brass pipe, 13.00-13.25.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 20.25-20.50, No. 2 copper 19.25, light copper, 18.25, refinery brass (60% copper), per dry copper content 18.25.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire No. 1 17.75-18.00, No. 2 16.75-17.00, light copper 15.75-16.00, No. 1 composition red brass 13.75-14.00, No. 1 composition turnings 13.25-13.50, mixed brass turnings 8.00-8.25, new brass clippings 15.00-15.50, No. 1 brass rod turnings 12.00-12.50, light brass 7.50-8.00, heavy yellow brass 9.75-10.00, new brass rod ends 12.50-13.00, auto radiators, unsweated 11.50-12.00 cocks and faucets 11.25-11.75, brass pipe 11.00-11.50.

Lead: Heavy 17.00-17.50, battery plates 11.50, linotype and stereotype 18.00-18.50, electrotype 16.50-17.00, mixed babbitt 15.75-16.25, solder joints, 19.75-20.25.

Zinc: Old zinc 7.75-8.25, new die cast scrap 6.25-6.75, old die cast scrap 4.00-4.50.

Tin: No. 1 pewter 65.00-67.00, block tin pipe 83.00-84.00, No. 1 babbitt 51.00-54.00, siphon tops 50.00-52.00.

Aluminum: Clippings 2S 12.00-12.50, old sheets 10.00-10.50, crankcase 10.00-10.50, borings and turnings 5.50-6.00, pistons, free of struts, 10.00-10.50.

DAILY PRICE RECORD

	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Aug. Avg.	23.230	19.325	15.000	103.00	16.269	35.000	40.000	73.790
Sept. 1	23.50	19.30–19.350	15.000	103.00	16.00–17.000	35.000	40.000	74.750
Sept. 2	23.50	19.30–19.350	15.000	103.00	16.00–17.000	35.000	40.000	75.000
Sept. 3-9	23.50	19.30–19.350	15.000	103.00	16.00–17.000	35.000	40.000	75.250

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, fob Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery, unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$42.50-43.00*
No. 2 Heavy Melt. Steel	42.50-43.00*
No. 1 Busheling	42.50-43.00*
Nos. 1, 2 & 3 Bundles	42.50-43.00
Machine Shop Turnings	37.50-38.00
Mixed Borings, Turnings	37.50-38.00
Short Shovel Turnings.	39.50-40.00
Cast Iron Borings	39.50-40.00
Bar Crops and Plate	49.00-49.50
Low Phos. Steel	49.00-49.50
Heavy Turnings	39.50-40.00

Cast Iron Grades

No. 1 Cupola	65.00-66.00
Machinery Cast	72.00-73.00
Charging Box Cast	59.00-60.00
Heavy Breakable Cast.	57.00-58.00
Malleable	69.00-70.00
Brake Shoe	55.50-56.00
Clean Auto Cast	58.00-59.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.50-44.00
R.R. Malleable	75.00-80.00
Axles	55.00-56.00
Rails, Rerolling	58.00-59.00
Rails, Random Lengths	54.00-56.00
Rails, 3 ft and under	61.00-62.00
Rails, 18 in. and under	62.00-63.00
Railroad Specialties	60.00-60.50
Uncut Tires	54.50-55.00
Angles, Splice Bars	53.00-54.00

* Plus applicable freight springboard.

CLEVELAND

No. 1 Heavy Melt. Steel	$42.00-42.50*
No. 2 Heavy Melt. Steel	42.00-42.50*
No. 1 Busheling	42.00-42.50*
Nos. 1 & 2 Bundles	42.00-42.50*
Machine Shop Turnings	37.00-37.50
Mixed Borings, Turnings	36.50-38.50
Short Shovel Turnings.	38.00-38.50
Cast Iron Borings	38.00-38.50
Bar Crops and Plate	47.00-47.50
Punchings & Plate Scrap	47.00-47.50
Heavy Turnings	42.00-43.00
Alloy Free Turnings	40.00-41.00
Cut Structurals	48.50-51.50

Cast Iron Grades

No. 1 Cupola	69.00-71.00
Charging Box Cast	58.00-60.00
Stove Plate	58.00-60.00
Heavy Breakable Cast.	54.00-56.00
Unstripped Motor Blocks	58.00-60.00
Malleable	78.00-80.00
Brake Shoes	52.00-53.00
Clean Auto Cast	68.00-70.00
No. 1 Wheels	58.00-60.00
Burnt Cast	56.00-57.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.00-44.00*
R.R. Malleable	78.00-80.00
Rails, Rerolling	60.00-66.00
Rails, Random Lengths	58.00-59.00
Rails, 3 ft and under	63.00-64.00
Cast Steel	56.00-58.00
Railroad Specialties	58.00-59.00
Uncut Tires	55.00-56.00
Angles, Splice Bars	61.00-62.00

* Plus applicable freight springboard.

VALLEY

No. 1 Heavy Melt. Steel	$42.50-43.00*
No. 2 Heavy Melt. Steel	42.50-43.00
No. 1 Bundles	42.50-43.00
Machine Shop Turnings	37.00-39.00
Short Shovel Turnings.	39.00-39.50
Cast Iron Borings	38.50-39.00
Low Phos.	48.50-50.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.00-44.00*

* Plus applicable freight springboard.

MANSFIELD

Machine Shop Turnings	$37.50-38.00
Short Shovel Turnings.	39.50-40.00

CINCINNATI

No. 1 Heavy Melt. Steel	$42.00
No. 2 Heavy Melt. Steel	42.00
No. 1 Busheling	42.00
Nos. 1 & 2 Bundles	42.00
Machine Shop Turnings	36.00
Mixed Borings, Turnings	36.00
Short Shovel Turnings.	38.00
Cast Iron Borings	37.00

Cast Iron Grades

No. 1 Cupola Cast	57.00
Charging Box Cast	45.00
Heavy Breakable Cast.	56.00
Stove Plate	50.00
Unstripped Motor Blocks	50.00
Brake Shoes	48.00
Clean Auto Cast	57.00
Drop Broken Cast	65.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.00
R.R. Malleable	70.00
Rails, Rerolling	55.00
Rails, Random Lengths	54.00
Rails, 18 in. and under	61.00

DETROIT

(Brokers' buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$37.50-38.00
No. 1 Busheling	37.50-38.00
Nos. 1 & 2 Bundles	37.50-38.00
No. 3 Bundles	37.50-38.00
Machine Shop Turning	31.50-32.00
Mixed Borings, Turnings	31.50-32.00
Short Shovel Turnings.	32.50-33.00
Cast Iron Borings	32.50-33.00
Punchings & Plate Scrap	42.50-43.00

Cast Iron Grades

No. 1 Cupola Cast	53.00-58.00
Heavy Breakable Cast.	47.00-52.00
Clean Auto Cast	53.00-58.00

BUFFALO

No. 1 Heavy Melt. Steel	$47.50-48.50
No. 2 Heavy Melt. Steel	41.75-42.25
No. 1 Busheling	41.75-42.25
No. 1 & 2 Bundles	41.75-42.25
Machine Shop Turnings	36.75-37.25
Mixed Borings, Turnings	36.75-37.25
Cast Iron Borings	37.75-38.25
Short Shovel Turnings.	38.75-39.25
Low Phos.	49.00-50.00

Cast Iron Grades

No. 1 Cupola	65.00-67.00
Mixed Cupola	63.50-64.00
Heavy Breakable Cast.	55.00-57.00
Malleable	70.00-75.00
Clean Auto Cast	62.00-64.00

Railroad Scrap

Rails, 3 ft. and under.	60.00-61.00
Railroad Specialties	55.00-56.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$45.00-46.00
No. 2 Heavy Melt. Steel	41.50
No. 1 Busheling	41.50
Nos. 1 & 2 Bundles	41.50
No. 3 Bundles	39.50
Machine Shop Turnings	37.50
Mixed Borings, Turnings	37.50
Short Shovel Turnings.	38.50
Bar Crop and Plate	50.00-51.00
Punchings & Plate Scrap	50.00-51.00
Cut Structurals	50.00-51.00
Elec. Furnace Bundles.	47.00-48.00
Heavy Turnings	45.50-46.50
No. 1 Chemical Borings	44.00-45.00

Cast Iron Grades

No. 1 Cupola Cast	63.00-65.00
No. 1 Machinery Cast.	67.00-68.00
Charging Box Cast	62.00-62.50
Heavy Breakable Cast.	62.00-62.50
Unstripped Motor Blocks	59.50
Malleable	76.00-78.00
Clean Auto Cast	64.00-65.00
No. 1 Wheels	68.00-70.00

NEW YORK

(Brokers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$39.00
No. 2 Heavy Melt. Steel	37.00
No. 1 Busheling	37.00
Nos. 1 & 2 Bundles	37.00
No. 3 Bundles	35.00
Machine Shop Turnings	29.00-29.50
Mixed Borings, Turnings	29.00-29.50
Short Shovel Turnings.	30.00-31.50
Punchings & Plate Scrap	42.00-42.50
Cut Structurals	42.00-42.50
Elec. Furnace Bundles.	42.00-42.50

Cast Iron Grades

No. 1 Cupola Cast	57.00-58.00
Charging Box Cast	56.00-57.00
Heavy Breakable	56.00-57.00
Unstripped Motor Blocks	52.50-53.50
Malleable	68.00-69.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$38.90
No. 2 Heavy Melt. Steel	34.40
No. 1 Bundles	34.40
No. 1 Busheling	34.40
Machine Shop Turnings	29.40
Mixed Borings, Turnings	29.40
Short Shovel Turnings	31.40
Bar Crops and Plate	39.00-40.00
Punchings & Plate Scrap	39.00-40.00
Chemical Borings	36.00-37.00

Cast Iron Grades

No. 1 Cupola Cast	65.00-70.00
Heavy Breakable Cast.	60.00-62.00
Stove Plate	54.00-55.00
Unstripped Motor Blocks	48.00-50.00
Clean Auto Cast	54.00-56.00

CHICAGO

No. 1 Heavy Melt. Steel	$41.50-42.00
No. 2 Heavy Melt. Steel	41.50-42.00
No. 1 Bundles	41.50-42.00
No. 2 Bundles	41.50-42.00
No. 3 Bundles	39.50-40.00
Machine Shop Turnings	36.50-37.00
Mixed Borings, Turnings	36.50-37.00
Short Shovel Turnings.	39.50-40.00
Cast Iron Borings	39.00-39.50
Bar Crops and Plate	47.00-48.00
Punchings	48.00-49.00
Elec. Furnace Bundles.	42.50-43.00
Heavy Turnings	41.00-41.50
Cut Structurals	46.50-47.00

Cast Iron Grades

No. 1 Cupola Cast	71.00-72.00
Clean Auto Cast	71.00-72.00
No. 1 Wheels	64.00-65.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	47.00-48.00
Malleable	80.00-81.00
Rails, Rerolling	64.00-65.00
Rails, Random Lengths	58.00-59.00
Rails, 3 ft and under	62.00-63.00
Rails, 18 in. and under	63.00-64.00
Railroad Specialties	56.50-57.50
Angles, Splice Bars	59.00-60.00

ST. LOUIS

No. 1 Heavy Melt. Steel	$44.00-45.00
No. 2 Heavy Melt. Steel	40.00-41.00
Machine Shop Turnings	35.00-36.00
Short Shovel Turnings	36.50-37.50

Cast Iron Grades (Fob shipping point)

No. 1 Cupola Cast	65.00-67.00
Mixed Cast	56.00-58 00
Heavy Breakable Cast.	59.00-60.00
Brake Shoes	60.00-61.00
Clean Auto Cast	65.00-67.00
Burnt Cast	59.00-60.00

Railroad Scrap

R. R. Malleable	71.00-72.00
Rails, Rerolling	63.00-65.00
Rails, Random Lengths	56.00-59.00
Rails, 3 ft. and under	60.00-61.00
Uncut Tires	51.00-52.00
Angles, Splice Bars	54.00-56.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$39.50
No. 2 Heavy Melt. Steel	39.50
No. 1 Busheling	39.50
Nos. 1 & 2 Bundles	39.00
No. 3 Bundles	37.00
Long Turnings	24.50
Short Shovel Turnings.	26.00-27.00
Cast Iron Borings	25.00
Bar Crops and Plate	40.00
Cut Structurals	38.50

Cast Iron Grades

No. 1 Cupola Cast	63.00
Stove Plate	60.00-62.00
No. 1 Wheels	59.00-61.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	38.00
R.R. Malleable	nom.
Axles, Steel	50.00
Rails, Rerolling	53.00-55.00
Rails, Random Lengths	45.00-48.00
Rails, 3 ft and under	53.00-55.00
Angles and Splice Bars	52.00-53.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*27.50
No. 2 Heavy Melt Steel	*27.50
No. 1 Busheling	*27.50
Nos. 1 & 2 Bundles	*27.50
No. 3 Bundles	*24.50
Machine Shop Turnings	*18.00
Bar Crops and Plate	*27.50
Cast Steel	*27.50
Alloy Free Turnings	*18.00
Cut Structurals	*27.50

Railroad Scrap

No. 1 Heavy Melting	*28.50
Axles	*34.00
Rails, Random Lengths	*29.00

* Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$27.50
No. 2 Heavy Melt. Steel	27.50
No. 1 Busheling	27.50
Nos. 1 & 2 Bundles	27.50
No. 3 Bundles	24.50
Machine Shop Turnings	21.00-22.50
Mixed Borings, Turnings	21.00-22.50
Punchings & Plate Scrap	35.00
Cut Structurals	26.00-28.00

Cast Iron Grades

No. 1 Cupola Cast	40.00-42.00
Heavy Breakable Cast.	35.00
Stove Plate	30.00
Unstripped Motor Blocks	32.50
Malleable	40.00
Brake Shoes	35.00
Clean Auto Cast	40.00
No. 1 Wheels	37.50-40.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	28.50
Railroad Malleable	30.00
Rails, Random Lengths	30.00-32.00
Angles and Splice Bars	28.50

LOS ANGELES

No. 1 Heavy Melt. Steel	$27.50
No. 2 Heavy Melt. Steel	27.50
Nos. 1 & 2 Bundles	27.50
Machine Shop Turnings	16.00
Mixed Borings, Turnings	15.50-16.00
Punchinge & Plate Scrap	28.00
Elec. Furnace Bundles,	28.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00

HAMILTON, ONT.

(Ceiling prices, delivered)

Heavy Melt.	$22.00
No. 1 Bundles	22.00
Mechanical Bundles	20.00
Mixed Steel Scrap	19.00
Mixed Borings, Turnings	17.00
Rails, Remelting	28.00
Rails, Rerolling	26.00
Bushelings	17.00
Bushelings, new factory, prep'd	21.00
Bushelings, new factory, unprep'd	16.00
Short Steel Turnings	17.00

Cast Iron Grades*

No. 1 Cast	42.00-48.00
No. 2 Cast	35.00-37.00

* Removed from price control Aug. 9, 1947; quoted on basis of fob shipping point.

Steel Bars . . .

Fourth-quarter quotas cut 5 to 20 per cent due mainly to allocation programs

Bar Prices, Page 164

New York—One leading hot carbon bar producer, the last to open books for tonnage beyond the end of this quarter, has just set up quotas for October. Quotas for customers in this district at least will be off about 20 per cent. Action by this seller for November and December may follow shortly. Delay is ascribed primarily to uncertainty concerning government-sponsored programs.

In general, however, bar producers have gone further on fourth quarter allocations than those of other major products. With few exceptions, bar mills have set up quotas for the entire quarter, even though more or less on a tentative basis. It might be added that one large independent, which for a considerable time past has been producing fewer and fewer carbon bars, has virtually blanked out the entire last quarter.

Cold-drawn bar sellers are booked up tightly over the remainder of the year and sellers of alloy bars, both hot and cold, have relatively little capacity left.

Boston—At least one producer will allocate some cold-finished bar tonnage starting Jan 1, including shafting and sizes and grades not cold-drawn in this area. Open-hearth alloys are sold through this year and there is little electric furnace capacity open. Cold finishers are concerned over hot-rolled tonnage to meet commitments which extend through this year. Only slight reaction to price differences is apparent. However, one of the largest group of users of carbon bars, textile mill equipment builders, pay from $3 to $3.60 per ton higher for a considerable tonnage than the lowest available delivered price.

Pittsburgh — Fourth-quarter mill quotas on bars have not been cut as sharply here as those on plates and shapes, as a result of increasing steel requirements under the voluntary allocation programs. One major producer states monthly quotas on bars for fourth quarter have been reduced about 5 per cent in contrast to 10 per cent on plates and shapes. Merchant carbon bar sellers report continued heavy demand from all sources throughout full range of product and size classifications. No let-up in requirements is noted for alloy bars, with open-hearth alloys further extended on mills' books.

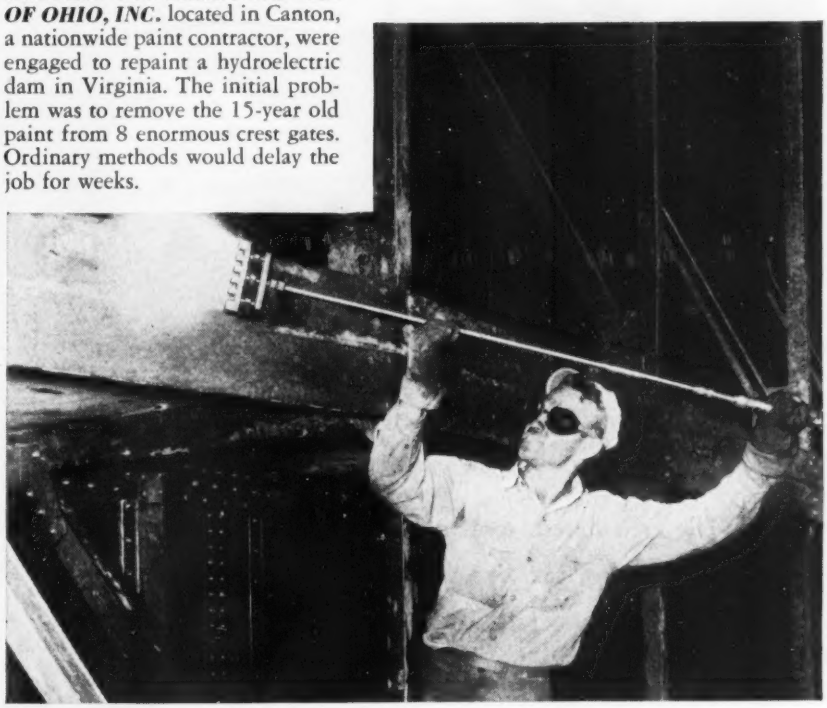
Reinforcing Bars . . .

Reinforcing Prices, Page 164

Seattle—Higher prices have not eased the pressure on rolling mills which have large order backlogs for reinforcing bars. The immediate concern is to expedite deliveries and reduce the volume of unfilled business. It is impossible to accept much of the business offering, preference being given to regular customers. Prices are not guaranteed beyond Dec. 31 and one plant has not yet opened books for the first quarter.

Flame cleaning speeds 'face lifting' on giant dam

MILLER CONTRACTING CO. OF OHIO, INC. located in Canton, a nationwide paint contractor, were engaged to repaint a hydroelectric dam in Virginia. The initial problem was to remove the 15-year old paint from 8 enormous crest gates. Ordinary methods would delay the job for weeks.



G. E. Hartwick, Airco Technical Sales Representative, suggested oxyacetylene flame cleaning with Series 9200 Torches and Airco Style 120 tips. Quickly and easily applied, the intense heat of the flame cockled the old paint, loosened scale and drove off surface moisture in a single operation.

The Miller Contracting Co. found that a flame cleaned surface made for a better finished paint job. An executive said, "We're convinced that flame cleaning is the most efficient and economical method of preparing steel surfaces prior to painting. We now use it almost exclusively for removing rust and scale."

• • • • •

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Technical Sales Service—though not a packaged commodity—is as readily available to all industry as any Airco process or product. If you have a metal working problem, ask to have a Technical Sales Division man call. Address Department S-8582, Air Reduction, 60 East 42nd Street, New York 17, N. Y. In Texas: Magnolia Airco Gas Products Co., Houston 1, Texas. On West Coast: Air Reduction Pacific Company, San Francisco 4, California.

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SECTIONAL FIXTURES Prove Flexibility

FOR CARRYING WORK IN A PIT TYPE FURNACE

The articulated, sectional design MICHIANA fixture is employed for carrying work in a pit type furnace in the plant of an important manufacturer of farm machinery.

Sections of uniform sizes can be assembled as required to accommodate the handling of large or small parts and quantities to be suspended for heat-treating purposes.

This flexible design plus durability and high load carrying capacity is another in-work example of MICHIANA skill and experience. Recommendations and quotations are yours for the asking. MICHIANA PRODUCTS CORPORATION, Michigan City, Indiana.

Illustrated Bulletin 110 will prove an interesting addition to your reference file. Sent upon request.

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Heat-Resistant and
Corrosion-Resistant
ALLOY CASTINGS

Sheets, Strip . . .

Sheet Prices, Page 164

New York—One of the last of the larger sheet producers to set up quotas for fourth quarter has advised consumers here that it will be able to furnish only a small new tonnage of hot or cold-rolled sheets. Fourth-quarter quotas on galvanized sheets, it also advises, will be off 50 per cent. Operating difficulties over months past have resulted in growing accumulation of arrearages in hot and cold-rolled sheets, with a result that the last quarter will be blanked out almost entirely. Another producer of hot-rolled sheets has cut quotas drastically, as a result of a slowdown which affected operations of one unit for several weeks this summer.

All producers have had to reduce quotas for the final quarter in one degree or another for the rank and file of consumers, primarily because of government-sponsored allocation programs. There is still uncertainty as to how much more of this government-sponsored allocation work will be added, although it appears that by far the bulk of it, insofar as it will apply to the remainder of this year, has been set up.

Silicon sheet producers have long since closed their books for fourth-quarter tonnage, with some planning to act before the end of this month on quotas for first quarter, at least for the first month or so beyond the turn of the year, because of the processing involved. Some stainless steel sheet producers are still able to make deliveries within ten to twelve weeks; still others are practically closed out for the year. In the experience of at least one or two sellers, supply and demand is about in balance with respect to long ternes.

Cold-rolled sheet shipments set a new all-time high at 583,417 net tons in July and compared with 441,294 tons in July, 1947. This brought the seven months total to 3,868,500 tons, an increase of 23 per cent over the total for the like 1947 period.

Boston—Not only are flat-rolled products in short supply, but consumers are confronted with varying steel costs due to price variances at mill points and differences in methods of basing. At the moment, excess demand over supply relegates price and costs to the background, but eventually costs will have greater impact on distribution. Producers of cold-rolled stainless strip are unable to establish quotations definitely due to price changes in hot-rolled.

Pittsburgh—Some mills have reduced monthly allotments on hot and cold-rolled sheets about 10 per cent for September and remaining months this year because of increased tonnage requirements under voluntary allocation programs. This pattern is not necessarily fixed at about 10 per cent for such preferred tonnage is expected to be substantially increased on the basis of additional priority programs now under consideration. One of these programs may involve considerable galvanized sheet tonnage for sheet metal contractors. Some sellers state priority tonnage commitments have been getting out of hand with nearly all industrial groups approaching OIC for assist-

ance. Some interests state the time has arrived to freeze allocations of steel under the program of voluntary agreements.

Chicago—Consumers of flat-rolled products, whose mill connections have revised October quotas downward because of the impending drain of voluntary allocation programs, have suffered more than they anticipated. Few of them got the tonnage promised them for third quarter. Fear is that the reduced quotas will continue throughout fourth quarter, which probably is a correct conclusion for the allocation programs are expected to increase in tempo as the quarter proceeds.

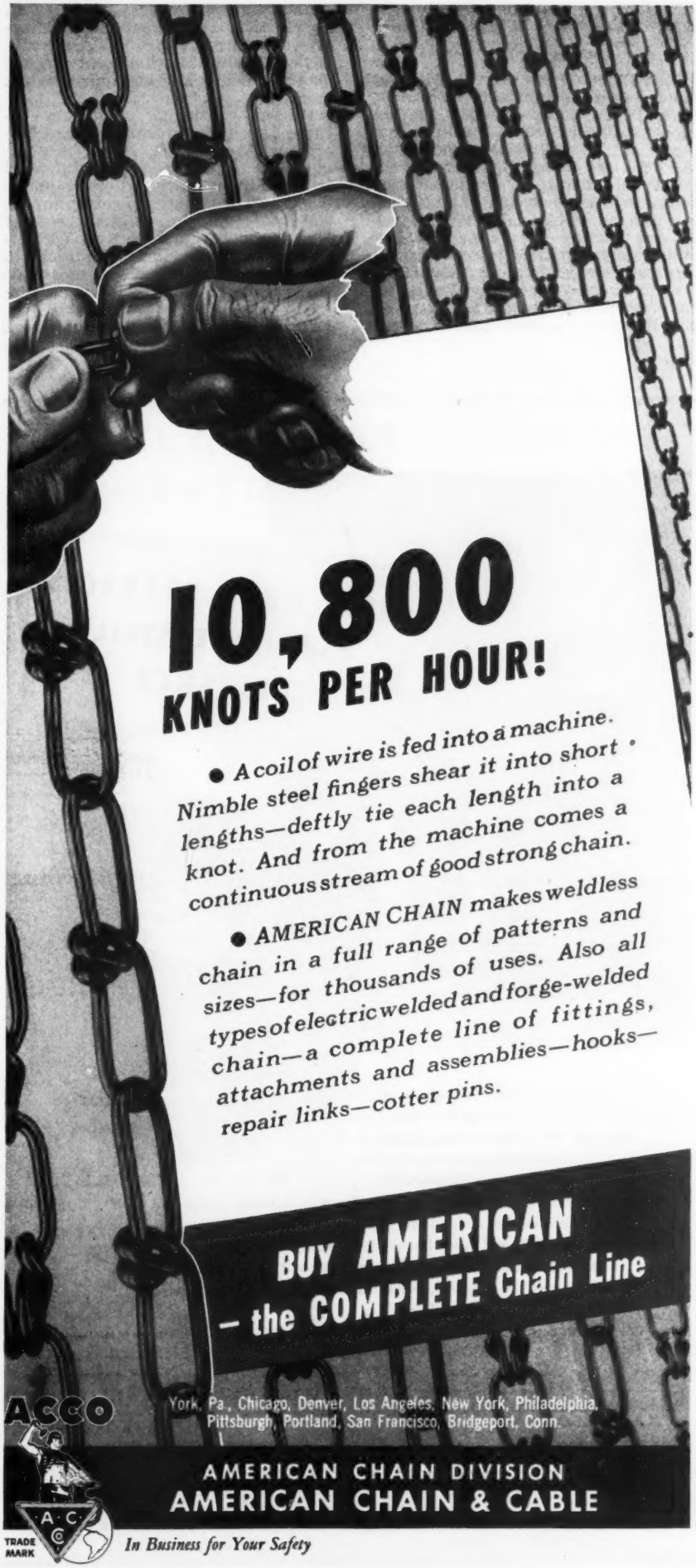
Cincinnati—Reductions have been made in sheet allotments for the fourth quarter from those granted earlier in the year. Such a cut is made necessary by the carryover, which in part reflects production handicaps several months ago, and the tonnage to be due on voluntary allocations in government programs. Percentage of decreases varies widely with grades. Insofar as mills can sense first quarter needs, the supply situation will continue tight early in 1949.

St. Louis—Granite City Steel Co., this area's principal sheet producer, expects to open its books formally for the fourth quarter some time this week. It will be the first time in nearly two years. Production in the company's new cold rolling mill is continuing to pick up moderately and spokesmen predict they will be current on orders by the yearend. First quarter books will open late in December when it is expected 1949's production outlook will be clearer. Adjustment difficulties in the cleaning and pickling lines and a revamping of electrical controls have delayed by several months the mill approaching its 40,000 ton capacity. Shipments of sheets for heating equipment and plates for railroad cars and barges under the voluntary allocations program will start next month.

Tin Plate . . .

Tin Plate Prices, Page 165

Pittsburgh—Despite moderate increase in domestic tin stock position there appears to be only an outside chance of additional tin being made available to domestic consuming interests. Some trade authorities contend a 10 per cent increase in monthly tin consumption is justified. However, the entire matter will depend on government policy with respect to the amount of tin that may be transferred to the permanent stockpile. This stockpile of tin is expected to exceed 40,000 tons by yearend. Some minor changes in tin plate order distribution may develop early in fourth quarter, for tin plate consumers are scrutinizing their requirements in relation to mill locations, transportation possibilities, etc. Greater use of barge shipments is indicated for months ahead, particularly when supply is in better balance with demand. Pent-up tin plate requirements for general line containers is expected to more than offset indicated seasonal easing in consumption of tin plate for perishable food pack programs later this year.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Structural Shapes . . .

Structural Shape Prices, Page 165

New York—Bids on the 3500-ton naval hospital addition at St. Albans, Long Island, have exceeded the appropriation with the possibility that plans will be revised for figuring later. The bus garage program for the municipal Board of Transportation continues to go ahead, with a 1000-ton unit in Brooklyn recently awarded and another of similar size also in Brooklyn expected to come up for figures shortly. Eastern fabricators are figuring on a 4000-ton bridge for the Southern Railways at Burnside, Ky. Bids will be opened in Washington Sept. 28.

Local demand is less active, with higher costs a deterrent factor. However, eastern fabricators generally have substantial backlogs, with shops quoting deliveries at four to six months.

Boston — Although contracts include 1100 tons for an industrial laboratory, West Lynn, Mass., new inquiry for fabricated structural steel is steadily narrowing toward public works. Outstanding project up for estimates, bids Sept. 27, is the New Hampshire Turnpike, Seabrook-Portsmouth, N. H., including 17 structures with railroad and river crossings, there being two of the latter, involving a total of several thousand tons. Despite declines in the type of work fabricated largely by district shops, backlogs cover several months with a nip and tuck situation in plain material to meet commitments; fourth quarter mill allocations will be somewhat lower to both fabricating shops and warehouses.

Philadelphia—Shape producers still have a way to go in rounding out consumer quotas for the final quarter. One leading mill has not set up general trade allotments for the last two months, although action is expected momentarily, and another has not set up quotas for December. Indications are that while allotments will be down from the current quarter, they will not be off as sharply as in the flat products despite the fact that demand is less pressing. This is ascribed to production being in relatively better balance with demand, even though short of requirements. Some Belgian shapes are being offered out of warehouse here.

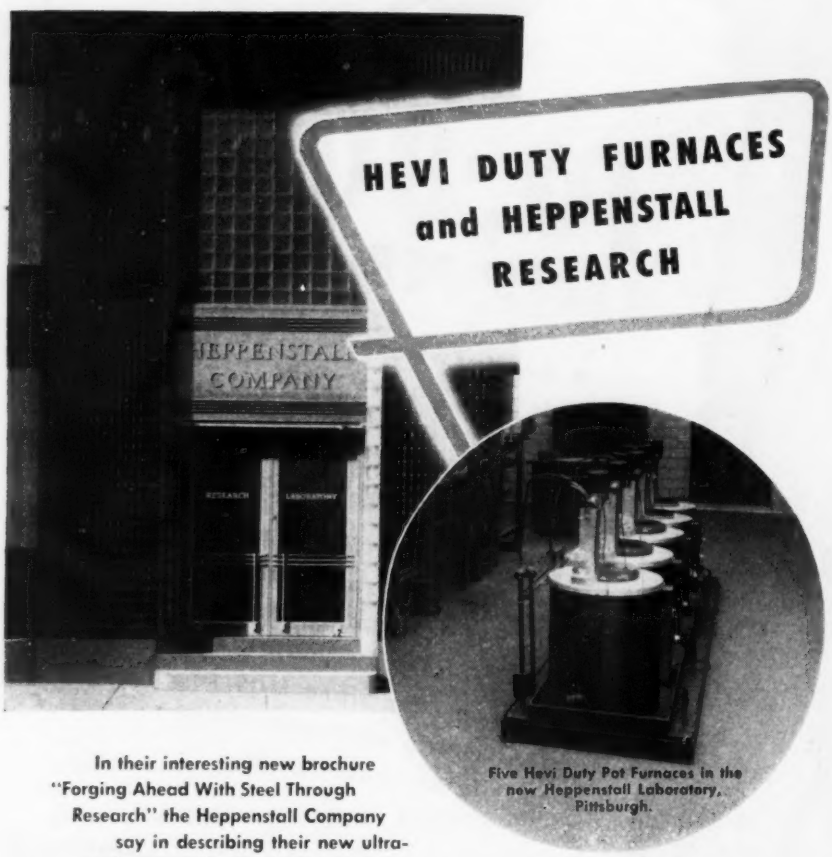
Structural demand is less active in the Philadelphia district, although fabricating shops have substantial backlogs.

Golden Construction Co. has been awarded the general contract on a section of subway work here, with orders expected to be announced momentarily for 1700 tons of wide flange beams, 780 tons of bearing piles and an unstated tonnage of temporary shoring steel. First steel for the large Delaware River Memorial bridge near Wilmington, Del., 1200 tons of piling, has been placed with the New York Shipbuilding Corp., Camden, N. J.

Pittsburgh—American Bridge Co. has been awarded a contract for 1100 tons of structural steel for construction of an approach to new Rankin-Whitaker bridge over Monongahela river near here. Most fabricators continue to make little headway against order backlogs and state indicated reduction of about 10 per cent in monthly mill allotments through remainder of this year will accentuate this situation.

Chicago—Although structural fabricators in this district have bookings which will keep them busy through the balance of the year, providing steel is available to them as promised, they report a declining volume of inquiries for industrial building. High costs of such construction and delays in getting work under way because of materials shortages are said to be responsible for the fewer projects offered for figuring. Volume of public works holds up well, but a seasonal drop off is expected soon.

Seattle — Fabricating plants are handicapped by limited supplies and are unable to compete for larger projects involving major tonnages. Operations are fairly normal as there is a good run of jobs involving less than 100 tons each. Interruption of water transportation is increasing current problems for it means shipments en route may be delayed indefinitely.



Five Hevi Duty Pot Furnaces in the new Heppenstall Laboratory, Pittsburgh.

In their interesting new brochure "Forging Ahead With Steel Through Research" the Heppenstall Company say in describing their new ultra-modern metallurgical laboratory

" - - superior research would be stimulated by superior equipment - - ".

Five Hevi Duty Pot Furnaces for constant temperature treatment of test samples are included in the heat treating equipment of this new laboratory.

Many manufacturers have standardized on Hevi Duty Furnaces of many types not only for production, but for pilot plant and other laboratory research use.

Pot Furnace details are in Bulletin HD-635 and HD-546. Send for them — today.

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Shipbuilding Work Increases

Philadelphia—New York Shipbuilding Corp., Camden, N. J., is negotiating for the construction of three tankers, each requiring about 8000 tons of steel, mostly plates. These are in addition to the three tankers recently booked, along with contracts for three

merchant ships and a cruiser. Shipments of steel for the work recently booked will not begin until after the turn of the year, it is said.

The Sun Shipbuilding & Dry Dock Co., Chester, Pa., has 13 tankers under contract, with steel for a considerable portion of the requirements now placed and under regular shipment. Another district commercial yard, Welded Shipyards Inc., Bridgeport, Pa., has one large tanker under construction and another under contract, both for National Bulk Carriers Inc., New York. The RTC Shipyards, Camden, N. J., has just booked a tug for the Pennsylvania Railroad, requiring 300 tons.

Structural Steel Sales Gain

New York—Estimated total bookings of fabricated structural steel for July increased 3.4 per cent over the June total, or to 167,960 tons from 162,367 tons, according to the American Institute of Steel Construction Inc. Bookings for the first seven months of 1948 totaled 1,130,049 tons, representing an increase of 23.9 per cent over the 911,593 tons booked in the like 1947 period.

A preliminary estimate of the July shipments gives a total of 135,584 tons, with a seven-months total of 1,101,243 tons, up some 5 per cent from the seven months total of 1947. The tonnage available for fabrication for the next four months only, stands at 613,200 tons compared with 660,919 tons at the same time a year ago.

Tubular Goods . . .

Tubular Goods Prices, Page 165

Boston—Due to the rapid turnover since the war, more pipe distributors have been on practically straight-purchase basis and to that extent withdrawal of consigned stocks in some instances has been minimized. Inventories are low and broadening of straight selling policy would not call for heavy investment for settlements. However, elimination of consigned stocks, a policy initiated in 1916 to curb price wars, will have some impact on distributors affected. They probably will lose protection on a rising market during a period of settlement, but sources of supply will be eventually broadened.

Pittsburgh—Republic Steels Corp.'s price action discontinuing distribution of pipe on a consignment basis to jobber account, has not been followed by pipe producers here. However, such action is being given serious consideration by some interests. No let-up in pipe demand is indicated through remainder of this year. Sellers are booked through 1951 on line pipe, while steady pressure for standard pipe items has prevented jobbers from augmenting depleted inventories. Unusual heavy demand also persists for carbon and alloy mechanical and pressure tubing, although not to extent of pressure for standard and line pipe items.

Seattle—The maritime strike threatens delay in the delivery of cast iron pipe, eagerly awaited by buyers in this area, adding to the difficulties of regional agencies. This development is expected to slow demand for cast iron tubing.

Wire . . .

Wire Prices, Page 165

Pittsburgh—Some improvement in supply of spring wire is noted, reflecting easing in demand for mattresses and bedding. Demand for fine wire specialties also is lighter. However, the occasional opening in rolling schedules is promptly filled with overall pressure for prompt shipment of bulk of wire products showing no sign of diminishing. Merchant wire items particularly are in short supply with jobbers' stocks well below normal. Despite fact production schedules have been fairly well sustained in recent weeks, mills have not been able to make much progress is narrowing the gap between supply and demand. Not all nail producers have adopted higher galvanizing extras on nails, while indicated price increase on galvanized wire and fencing has not materialized.

Boston—Most wire mill schedules are filled for the fourth quarter, but revisions are likely among nonintegrated units. Rod allocations are more or less pegged. Demand for most wire products holds at a high level and allocations for fourth quarter are about same as for third.

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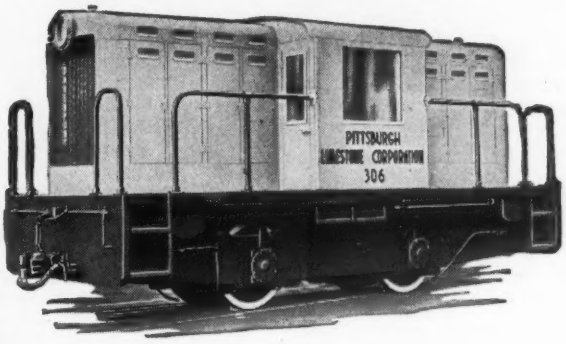

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Plates . . .

Plate Prices, Page 165

Philadelphia — With allocation programs scheduled to take at least one-third of the fourth-quarter plate production and most mills substantially behind on commitments, the general trade is becoming reconciled to sharp cuts in their quotas for the final three months of the year. Some producers, in fact, have not set up consumer quotas for the full quarter, but word being passed out to customers inspires little hope for their getting anywhere near the new tonnage they are even likely to receive in the current quarter. However, of the approved allocations, a portion of the tonnage scheduled would probably be distributed to the consumers involved anyway. Hence, a full one-third of the production will not be withheld from non-preference consumers.

New York—Stringency in plates appears more pronounced than ever. With few exceptions, arrearages at the end of this quarter will be heavier than three months ago and requirements of voluntary allocation programs will be substantially heavier. Mills are still moving slowly in setting up quotas for the final quarter, although most of them have set up allocations on at least a tentative basis.

Boston—Probably no steel product is more affected by voluntary distribution programs than plates. Integrated fabricating shop requirements and tonnage for general distribution are steadily shrinking. For the fourth quarter, allocations are down 10 per cent and more in some cases. Carryovers are also a factor and generally will be as heavy at the end of this quarter as last. Warehouses and tank shops are especially hit by lower volume. Price structure is unstable with varying recent extra changes adding to the confusion.

Seattle—Demand for tanks, smokestacks and similar jobs, involving small tonnages of plates, is providing sufficient work for the smaller plants to operate steadily.

Rails, Cars . . .

Track Material Prices, Page 165

New York—Domestic freight car awards in August amounted to 3739 cars, against 11,923 in the preceding month, according to the American Railway Car Institute. This was the second lightest total so far this year, with awards in May amounting to 2230 cars.

Cars on order as of Aug. 31 totaled 118,153 cars, against 113,680 cars in the corresponding period of last year.

For the second time in three months production of freight cars in August passed the 10,000-car mark. August deliveries amounted to 10,362, slightly lower than the June record of 10,381. August shipments comprised 7450 from commercial car builders and 2912 from railroad shops. They included 4290 box cars, 3618 hoppers, 616 refrigerator, 625 tank and 1113 gondola cars.

Following a rather dull month in August, car buying continues light, with the award of 600 hopper cars by the Pittsburgh & West Virginia, outstanding.

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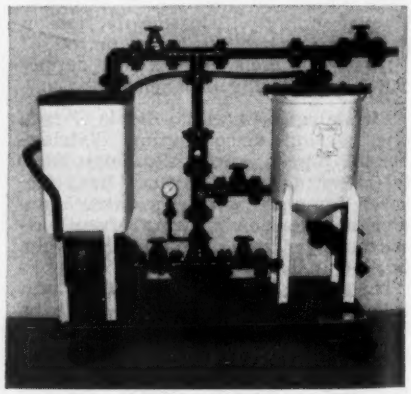

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Ferroalloy Prices Revised

New York—Electro Metallurgical Sales Corp. announced price increases last week on a number of products. The new prices will generally apply for delivery anywhere in the United States. They become effective Oct. 1 on both spot and contract sales.

There are no changes in packing, quantity, sizing, and spot differentials for any products.

Silicon Alloys

The new base price for 50% per cent ferrosilicon becomes 10.5c per pound of contained silicon. Specific increases in other grades of ferrosilicon are as follows: Low-aluminum 50 per cent ferrosilicon is up 1.2 cents a pound; 65 per cent ferrosilicon up 1.4 cents a pound; 75 per cent ferrosilicon up 1.2 cents a pound; 85 per cent ferrosilicon up 1.35 cents a pound; 90 per cent ferrosilicon up 1.5 cents a pound; silicon metal up 1.7 cents a pound. All revisions are per pound of contained silicon. Ground 15 per cent ferrosilicon is raised $6 a gross ton and will continue to be sold f.o.b. producing point at Niagara Falls, N. Y.

Manganese Alloys

Standard ferromanganese, which is sold f.o.b. producing or stock point, is raised from $145 to $160 a gross ton, and the former discount of ½ of 1 per cent for payment in 10 days is eliminated. Low-carbon ferromanganese is raised 2.25 cents per pound of contained manganese; medium-carbon ferromanganese up 1.65 cents; low-iron ferromanganese up 1.35 cents; and manganese metal up 3 cents per pound of metal. Silicomanganese is increased 0.8 cents per pound of alloy.

Chromium Alloys

High-carbon ferrchrome alloys are increased 1.9 cents per pound of contained chromium. Low-carbon ferrochrome, in grades, from maximum 0.03 per cent carbon to maximum 0.10 per cent carbon, is increased 2.25 cents per pound of contained chromium. The maximum 0.15 per cent, 0.20, and 0.50 per cent carbon grades are raised 2.5 cents. The maximum 1 and 2 per cent carbon grades are raised 2.75 cents. All grades of chromium metal are up 10 cents per pound of contained chromium.

New Briquet Prices

Increases in the prices of briquetted alloys used by foundries are as follows: Silicon briquets are up 0.65 cent per pound of briquet; chromium briquets, up 1.25 cents; ferromanganese briquets, up 1.3 cents; and silicomanganese briquets, up 1.25 cents.

Other Alloys

Increases of about 10 per cent also apply to the zirconium alloys, the calcium alloys, ferrocolumbium, and other special alloys.

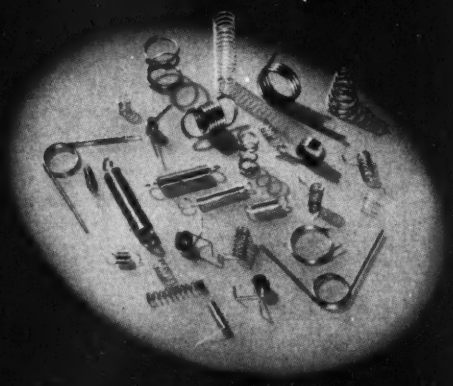
Prices of the vanadium and tungsten alloys remain unchanged.

Warehouse . . .

Warehouse Prices, Page 167

Pittsburgh—No definite pricing policy on stainless has yet been formulated by jobbers as result

Music Spring Wire



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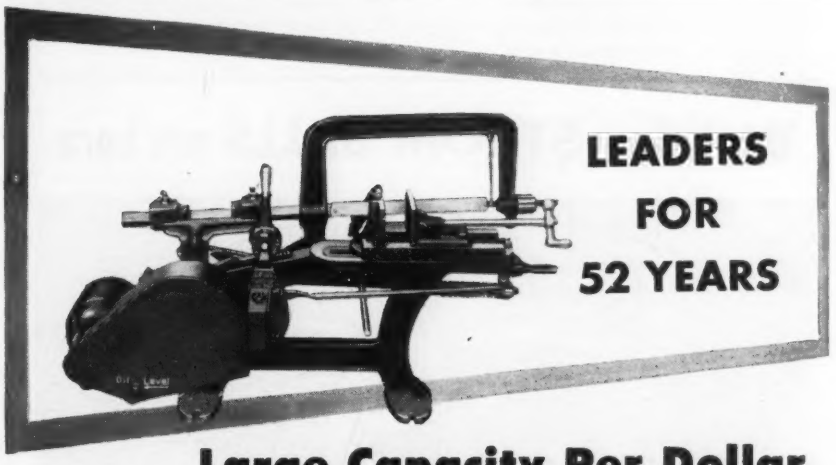

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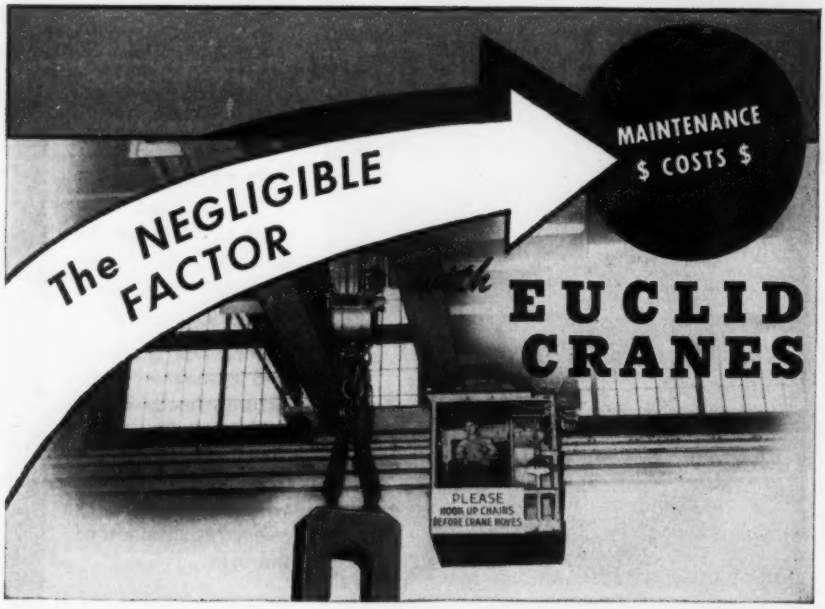

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of action by some mills in eliminating functional jobbers discounts. These discounts were 10 per cent on sheets and plates; 5 per cent on strip and wire; from 7½ to 10 per cent on bars; while discount on tubing of 5 per cent is now applicable on shipments direct to customers and for stock. Not all stainless steel producers have dropped the functional discount to jobbers. In some instances such action is improbable because entire outlet is marketed in this manner, or because of long term contract arrangements with the jobbers. Some interests, such as Republic Steel Corp., are still allowing the functional discount to jobbers on direct shipments to customer. Mills taking this action contend the jobber discount has been unwarranted, pointing out such selling practice is not followed on carbon sheets and other products. Unlike pricing of carbon steel products at usual warehouse price spread, jobbers' stainless steel prices have been at mill level.

New York—More specialties are tightening and products which up to recently have been reasonably easy to obtain are more extended. Warehouses are unable to place orders for alloys for delivery this year, except stainelss for December in scattered instances. Prices on stainless are mixed and varied, reflecting the same situation at the mill level. Carbon steel allocations for fourth quarter are down, notably on plates, although all products are in short supply.

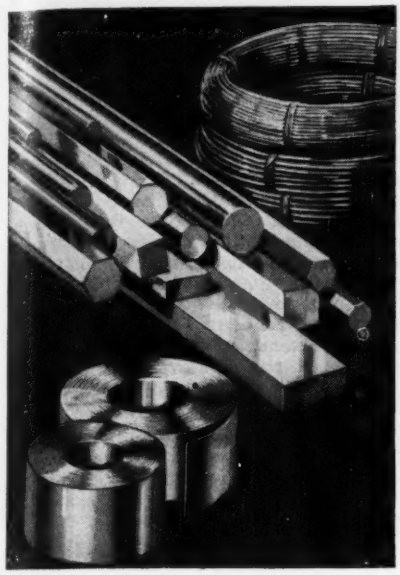
Scrap . . .

Scrap Prices, Page 170

Pittsburgh—Pressure for higher scrap prices has eased with indicated increase in mill receipts of foreign scrap. Other factors include growing resistance on part of mills to exceed the theoretical maximum $2.50 springboard and greater insistence on shipments meeting specifications. Some mills report inventories in fair shape. A centralized buying agency to handle German scrap will be set up, with a majority of scrap interests and mills favoring such action. Higher price range on specialties appears developing on the basis of bids submitted on the Pennsylvania Railroad list which closed Sept. 9. Cast scrap demand remains heavy, reflecting pig iron scarcity, with prices continuing firm at previous levels.

Philadelphia — Steel scrap importations are increasing, but are not expected to come in sufficient volume at this time to cause a drop in prices. Mills are still in need of all the scrap in sight for building winter inventories, and possibly the most that can be said of the influence of foreign scrap importations is that they may be keeping prices from advancing still higher.

In addition to two cargoes of steel scrap which have arrived here since the first of the month, one from the Pacific and the other from Germany and totaling 20,000 tons, four cargoes of German scrap are scheduled to arrive in Philadelphia in September, totaling 32,000 tons. The latter tonnage will be fully prepared and will be for shipment to Bethlehem, Pa. Two of the shipments were orig-



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inally scheduled to arrive at New York, but scarcity of barges for the further movement of scrap to Lackawanna, N. Y., resulted in the shift of ports. Meanwhile, two cargoes, involving 18,000 tons, principally for Lackawanna, are being received at New York.

The two cargoes to have first arrived in Philadelphia this month, as reported in last week's issue, are for distribution among three district mills. Heavy arrivals of scrap here this month will impose an additional burden on an already existing shortage of freight cars.

New York—Brokers' buying prices on turnings have been revised, with machine shop turnings and mixed borings and turnings now holding at $29 to $29.50 f.o.b. shipping point and short shovel turnings at $30 to $31.50. Major open hearth grades and low phos prices are unchanged, also prices on cast grades.

The leading Pittsburgh consumer is now releasing shipments on bundles, although cautioning sellers that the quality must be up to specifications. In general, steel scrap demand is strong, with tonnage still coming out in fair quantity.

Boston—Demand for cast scrap is heavy, reflecting in part the shortage of pig iron. Prices are strong with higher quotations paid for most grades. Heavy melting steel scrap is steady and firm, but lacks the activity displayed for cast. Open-hearth scrap is moving at formula prices for the most part, but scattered higher prices are paid for strictly number one material.

Cleveland—Scrap prices are more firm than at any time in the last year. Although demand is heavy, the scrap flow has improved as a result of an increase some weeks ago in price formulas and the prospect of substantial receipts of foreign material. However, some mills report inability to obtain enough scrap for current consumption, with the result they are dipping into inventories now when they should be accumulating reserves for winter. Hope for an adequate winter supply is being placed in anticipated receipts of foreign scrap.

Further urging to bring substantial amounts of foreign scrap to the United States came last week from a prominent Cleveland foundry in a letter to Alex Miller, adviser on Scrap Iron & Steel, U. S. Department of Commerce. Citing high prices of pig iron from foreign countries, the foundry said: "Without the slightest objection to recovery in Europe, we cannot see that American iron and steel scrap should be left there to be converted into pig iron for sale here at fantastic prices when it could and should be brought back here and converted by our own furnaces with immense relief of the pig iron shortage and immediate extinction of many of the black markets."

Buffalo — Increased receipts of foreign battlefield scrap here seem to have a sobering effect on recent talk about higher prices being in the offing. In addition to imports, the summer movement of scrap appears heavier than generally expected two weeks ago. This does not mean that reserve stockpiles are ample to assure capacity operations throughout the winter, but an appreciable improvement has been noted in reserves at

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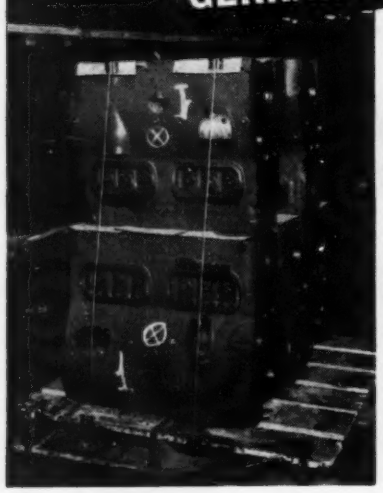

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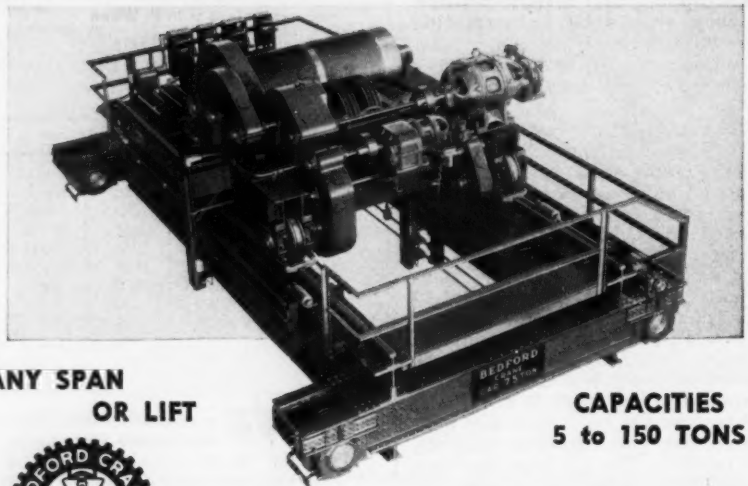

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leading mill yards. It is estimated that more than 5000 tons of war scrap has arrived with additional barges expected via the canal from the seaboard.

Detroit—Scrap market is described by some observers as a "little doggy" at the moment, although sales are generally holding strong at the formula level. Blast furnace material had been weak until a recent purchase for a Buffalo furnace. Instances of premium items being sold have practically disappeared. Loss of a month's production by Hudson meant the loss of about 5000 tons of production scrap, requiring the local melter of this material to reinforce stocks with outside buys. Foundry purchases are at low ebb.

Chicago — Some of the pressure which has persisted in the market here for several weeks is now lacking, an easing which started before the Labor Day holiday. This appears to be a reflection of good shipments recently and an improved inventory position of most steel mills. One nearby mill is out of the market temporarily, reportedly having built stocks up to a 90-day supply. Formula prices apply to the usual steelmaking grades, but specialties, especially the railroad grades, adhere to their abnormally high levels.

Cincinnati—Prices in the iron and steel scrap market are unchanged, although considerable instability is caused by higher bids being offered for tonnage destined for use in conversion deals. Cast scrap is still strong, although most foundries have been able to build reserve stocks. Occasional complaints are heard about quality of offerings.

St. Louis—Scrap shipments to this district are not picking up as expected, hence, prices are holding firm despite good mill inventories. Cast prices are fluctuating due to the pressure of pig iron scarcities. Mill buyers profess to see a slight improvement in the overall scrap situation, and mention the telephone solicitude of brokers as one good indication. Shipments normally increase sharply here in October, and the question then will be whether the big melters can obtain stockpiles, at prices prevailing now, adequate to tide them over the winter period of short shipments. Another significant sign is the mills' increasing rejections of poor quality shipments. The usual result is that they get the same scrap back after the broker is put to some winnowing expense. Until lately, scrap quality has been so bad rail offerings have commanded a heavy premium. For a while No. 1 railroad steel with a normal value of $40 was drawing $46, and $60 rails were selling as high as $68.

Seattle—No. 1 and No. 2 heavy melting, also No. 1 busheling have advanced from $26 to $27.50, per gross ton, fob cars, Seattle. Other scrap items have risen in proportion, punchings and plate scrap being $35 and random length rails $30 to $32. The market is firm. Some buying by Eastern interests is reported. Supplies are coming in satisfactorily and inventories are gradually increasing. The supply of surplus ships is reported about exhausted and when current backlogs are cleaned up by breaking plants, the outlook for sufficient steel scrap is not too bright.

Pig Iron . . .

Receipts of imported iron expected to help relieve present shortage

Pig Iron Prices, Page 166

New York—Although some furnaces will have less tonnage to supply the general run of consumers, due in part to special allotments of pipe makers, most district foundries are counting on a little more tonnage from domestic furnaces than they received in August. This is ascribed to generally higher pig iron production. They also anticipate some relief from imported iron which is now coming in more freely, particularly from Holland, Belgium and France. Small foundries will not be able to obtain relief if called upon to finance purchases of two and three hundred tons at a time. That is practically out of the question. However, some importers are able to distribute incoming tonnages in small lots, and while a small foundry may have to pay somewhat more on a carlot basis, it is cheaper than to try to finance larger quantities and it is desirable when it means that it is the only other alternate to suspending operations. Between 20,000 and 30,000 tons of low phos Italian iron are being offered for delivery later in the year and also modest tonnages of Austrian iron, mostly of the malleable grade.

Boston—Interest in pig iron is centered largely in buying of foreign iron and heavier arrivals of imported material. Numerous foundries are able to remain in operation with imported tonnage and, while price is high, melters are forced to pay or close in many cases. One steelworks will be able to operate due to an agreement reached regarding the Cleveland furnace, but foundries getting iron from that source expect to be affected by allocation of 5000 tons per month to Kaiser-Frazer.

Pittsburgh—Critical pig iron shortage has been alleviated somewhat by downward trend in new orders booked by gray iron jobbing foundries making light castings. Some of these foundries are now able to promise relatively current delivery on new business. High production costs, through enforced greater use of exorbitantly high-priced scrap and increased wage rates, have forced some jobbing foundries to price themselves out of such markets which compete with welded stampings. Some easing also is noted in requirements for malleable castings, although deliveries remain extended six to eight months. Demand for steel castings from the railroad industry remains very good, involving such items as side frames, bolsters and center plates. However, this appears to be the lone exception in an otherwise depressed market.

Philadelphia—While foreign pig iron importations are increasing, they still are only a little more than scratching the surface of demand. Steel mills complain of continued shortages and district foundries are still operating at curtailed rates. Although at somewhat better average than last month, oven coke shipments

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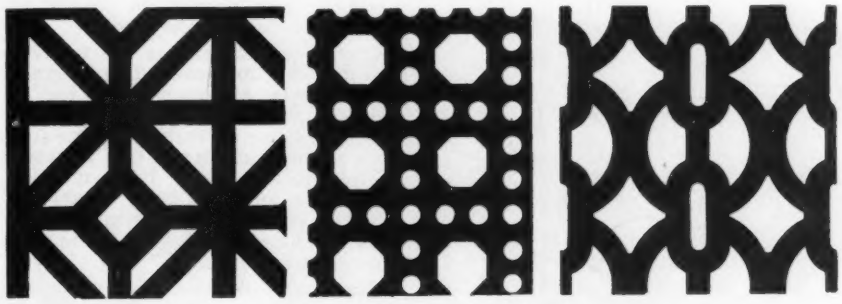
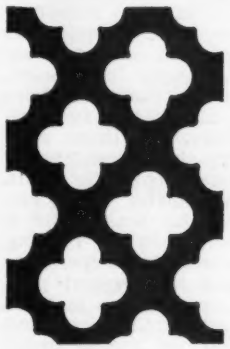
7 THOMAS MACHINE MANUFACTURING COMPANY PITTSBURGH, 23, PA.





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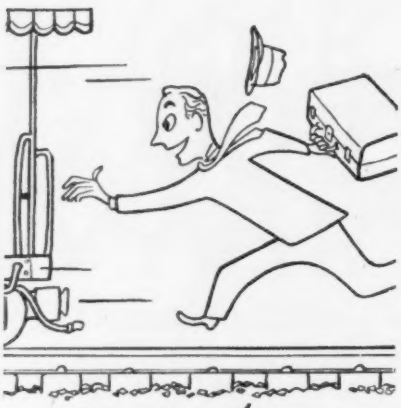

You still have time to make the

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Sept. 28, 29, 30, Oct. 1, 1948

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are down from a month ago, but most consumers have a fair supply on hand and are not contemplating any real stringency until possibly late in the fall.

Buffalo—Merchant iron supplies are being spread even thinner as producers report poor quality coke is cutting into tonnages. The prolonged period of inferior coke is having a definite bearing on shipping schedules of sellers. The railroad car situation is also creating problems.

In view of the tight market, the Tonawanda Iron Corp. furnace, controlled by American Radiator & Standard Sanitary Supply Corp., is still pressed into service despite constant repairs. Operations here remain at 100 per cent with all 16 stacks active, but the coke problem is reflected in output.

Chicago—Foundrymen are resigned to the fact they will be unable to improve their melting operations in the near future because of inadequate supply of pig iron. They already have gone as far as they can in use of scrap to make up for iron deficiency. Distributors of pig iron have a real chore in keeping furnace shipments moving in an even distribution pattern. Under present conditions of high level steelmaking, demand for hot metal limits the amount of iron that can be sold. The situation may improve somewhat in another month or so when Youngstown Sheet & Tube Co. blows in its new 1400-ton stack at Indiana Harbor, Ind. But by that time, a merchant furnace in the district may have to go down for repairs. Inland Steel Co., which had hoped to devote some capacity to merchant iron shortly, is obliged to hold these plans in abeyance.

Cincinnati—Shipments of foundry iron into this district hold near established levels, although some lag in southern iron may appear as a result of recent labor difficulties at one furnace. The pinch in pig iron is chiefly responsible for a light melt, a number of interests being unable to schedule more than four days. Supplies of oven foundry coke appear somewhat easier.

St. Louis—Pressure of abnormal scarcity of pig iron is beginning to be felt here. A month ago Missouri-Illinois Furnaces Inc., supplier of 90 per cent of the area's iron, dropped to half capacity for repairs, and now many of its customers who had stockpiled small tonnages in advance are exhausting those supplies. No foundry shutdowns are reported, but curtailments to short work-weeks are fairly numerous. This normally is the season for a fall pickup, especially in the heating equipment manufacturing here. Mo-Ill has abandoned its original plan to alternate its one furnace in blast between basic and foundry iron and is now producing an "in-between" iron of 1.60 to 1.70 silicon content.

Seattle—Foundries have limited supplies of pig iron and indications are no further shipments of this material may be expected before October as no surplus is available. More cast iron scrap is being used, this material being in fairly good supply, priced at $40 and $42, the latter figure for choice lots. Eastern buyers have firmed the local market. Foundry operations are being curtailed.

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HOTEL CLEVELAND
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Iron Ore . . .

Iron Ore Prices, Page 166

Cleveland—Shipments of Lake Superior iron ore from the upper lake ports totaled 11,734,794 tons during August, decrease of 387,450 tons from the August, 1947, total, according to the Lake Superior Iron Ore Association, this city. This brought the total for the season through August to 54,569,709 tons.

August shipments included 592,914 tons from Escanaba, 591,609 tons from Marquette, 681,790 tons from Ashland, 4,193,274 tons from Superior, 2,886,448 tons from Duluth, and 2,668,523 tons from Two Harbors, making the total from United States ports 11,614,558 tons compared with 11,788,458 tons during August, 1947.

During the season through August, shipments totaled 3,087,191 tons from Escanaba, 2,778,280 tons from Marquette, 3,542,968 tons from Ashland, 20,064,734 tons from Superior, 12,433,868 tons from Duluth, and 12,072,985 tons from Two Harbors, making the United States total 53,980,026 tons against 49,977,612 tons for the like 1947 period. Canadian shipments, totaling 589,683 tons for the season, included 319,870 tons from Michipicoten and 269,813 tons from Port Arthur.

Total shipments for the week ended Sept. 6 totaled 2,600,812 tons compared with 2,566,028 tons for the week ended Aug. 30 and 2,711,539 tons for the like week a year ago. Shipments from United States ports totaled 2,549,015 tons during the week ended Sept. 6, or at an average daily loading rate of 364,145 tons against 359,195 tons for the preceding week.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1200 tons, piling, Delaware River Memorial bridge, near Wilmington, Del., to New York Shipbuilding Corp., Camden, N. J.

1100 tons, laboratory, General Electric Co., Lynn, Mass., to American Bridge Co., Pittsburgh.

1000 tons, Flatbush bus garage, Brooklyn, N. Y., New York City Board of Transportation, New York, to Schacht Steel Construction Inc., that city.

350 tons, powerhouse, Fraser Paper Co., Madawaska, Me., to Haarmann Structural Steel Co., Holyoke, Mass.; Stone & Webster Engineering Corp., Boston, engineer-contractor.

350 tons, St. Martin's Catholic church, Philadelphia, to Bethlehem Steel Co.

320 tons, state bridge, Clearfield county, Pennsylvania, to American Bridge Co., Pittsburgh.

290 tons, Du Pont research building, Waynesboro, Va., to Ingalls Iron Works, Birmingham.

270 tons, two municipal recreation centers, Philadelphia, through M. & L. Construction Co., to Bethlehem Steel Co.

240 tons, including 40 tons reinforcing, Public Roads Administration bridge, Douglas county, Oregon; general contract to Lockyear & White, Portland, Oreg., low $123,317.

200 tons, state bridge work, Bradford county, Pennsylvania, to Bethlehem Steel Co.

STRUCTURAL STEEL PENDING

4000 tons, bridge, Burnside, Ky., Southern Railways, Washington, bids Sept. 28.

3500 tons, addition, Naval Hospital, St. Albans, Long Island, bids have exceeded the appropriation, with the probability that plans will be revised.

3050 tons, towers and substation work, Union Electric Power Co., St. Louis; Stone &

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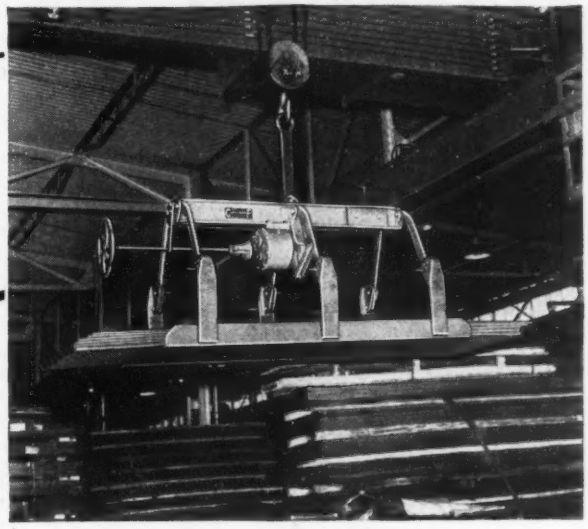

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Webster Engineering Corp., Boston, engineer-contractor.

2480 tons, wide flange beams and bearing piles, plus unstated tonnage of temporary shoring steel, subway work, Philadelphia; Golden Construction Co., that city, awarded general contract.

1415 tons, Washington state Agate Pass bridge; bids to Olympia, Oct. 1.

700 tons, Divine Providence Hospital, Williamsport, Pa.; bids Sept. 17.

330 tons, nurses home, Burbank Hospital, Fitchburg, Mass.; rebids Sept. 9.

300 tons, boilerhouse addition, American Viscose Co., Marcus Hook, Pa., pending.

250 tons, service building, Passayunk Ave., Philadelphia, pending.

250 tons, state bridges, Connecticut; bids Sept. 13, Hartford.

250 tons, housing project, Worcester, Mass. several contractors.

200 tons, elementary school, Philadelphia; Ralph Herzog low on general contract.

150 tons, gymnasium, Wilmington, Del., bids opened Sept. 2.

Unstated, University of Washington Shell Fisheries Center; bids for first $400,000 unit, to Board of Regents, Sept. 15.

Unstated, approaches and replacements Longview bridge, $1,400,000 project; bids to Washington Toll Bridge Authority, Olympia, in October.

Unstated, miscellaneous items for Grand Coulee power house; Sch. 2399.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1300 tons, First Hill apartment house, Seattle, to Bethlehem Pacific Coast Steel Corp.; Nettleton & Baldwin, general contractors.

REINFORCING BARS PENDING

5000 to 7000 tons, furnished by Bureau of Reclamation, Soap Lake siphon, Columbia Basin project; bids to Bureau about Sept. 15.

400 tons, Washington state Agate Pass Bridge; bids to Olympia, Oct. 1.

Unstated, approaches and replacements, Longview bridge; bids to Washington Toll Bridge Authority in October.

Unstated, $1½ million Montgomery Ward warehouse, Portland, Oreg.; bids opened in Chicago Sept. 6.

Unstated, $3 million department store and other buildings, Northgate center, Seattle; bids Sept. 13 to Suburban Co.

Unstated, 130-foot span and approaches near Sumner, Wash.; plans in preparation by Pierce county commissioners.

PLATES . . .

PLATES PENDING

3000 tons or more, 8100 feet, 22.3 feet diameter Soap Lake siphon, Columbia Basin project; bids to Bureau of Reclamation about Sept. 15.

Unstated, 12,960 linear feet steel piling for Agate Pass bridge; bids to Olympia, Wash., Oct. 1.

PIPE . . .

CAST IRON PIPE PENDING

850 tons, various sizes for Portland Water department; bids to Portland, Oreg., purchasing agent, Sept. 8.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Bangor & Aroostock, 14 diesel-electric locomotives, to Electro-Motive Division, General Motors Corp., La Grage, Ill.; the list comprises two 2000-horsepower passenger units, four 1000-horsepower switching units and eight 1500-horsepower branch line units.

RAILROAD CARS PLACED

Pittsburgh & West Virginia, 600 fifty-ton hopper cars, to Pressed Steel Car Co., McKees Rocks, Pa.

CONSTRUCTION AND ENTERPRISE

ARKANSAS

EL DORADO, ARK.—Lion Oil Co. plans to build a $250,000 plant.

GEORGIA

DECATUR, GA.—Henry & Hutchinson Inc. has added 6000 feet of floor space to its plant. Company is working on development of a fluid coupling and overdrive for motor vehicles in addition to other jobs which include manufacture of bomb shackles and camera parts for the Air Force.

MACON, GA.—Glidden Co., Berea and Madison Sts., Cleveland, has awarded a $2,500,000 contract to Rust Engineering Co., Exchange Bldg., Birmingham, for design and construction of a margarine and mayonnaise manufacturing plant.

KENTUCKY

CALVERT CITY, KY.—Pittsburgh Metallurgical Co., 3801 Highland Ave., Niagara Falls, N. Y., is planning to build a $1 million mill-type plant for manufacture of alloys.

MARYLAND

BALTIMORE—Anchor Post Products Inc. has awarded a contract for erection of a one-story warehouse.

BALTIMORE—Consolidated Gas, Electric Light and Power Co. plans to build pipe lines costing over $2 million.

BALTIMORE—Dolphin Radiator & Fender Works has acquired the adjoining property of Frank G. Schenuit Rubber Co. which it expects to use for expansion.

BALTIMORE—Signode Steel Strapping Co., Chicago, is building a new plant to produce steel strip for packaging heavy products.

BALTIMORE—Harrison Bolt & Nut Co., formerly of New Jersey, 625 South Smallwood St., has been incorporated with A. L. Byrd as president.

BALTIMORE—A. S. Abell Co., Charles and Baltimore Sts., has awarded a $5 million contract to George A. Fuller Co., 2326 N. Charles St., for a newspaper plant building for the *Baltimore Sun*.

NEW JERSEY

BURLINGTON, N. J.—Pennsylvania Railroad, H. T. Freshour, chief engineer and vice president, Pennsylvania Station, Eighth Ave. and 33rd St., New York, is planning to spend $250,000 on a railroad station and track work.

NEW YORK

BROOKLYN, N. Y.—Leviton Mfg. Co. Inc., 236 Greenpoint Ave., is contemplating erecting a $390,000 factory at 175-87 Jewel St.; plans by David Levy, 70 E. 45 St., New York.

BROOKLYN, N. Y.—Induction Heating Corp. is making its ther-monic induction and dielectric heating equipment available to industry on a rental-purchase plan. Units may be rented on a monthly basis with option to purchase at any time.

NEW YORK—A. Bleyer Co. has awarded a contract to Capitol Steel Corp. of New York, 15 Park Row, for a building to be located at 57th St. and 59th Ave., Queens.

ROCHESTER, N. Y.—Eastman Kodak Co., Kodak Park, plans to build a $628,000 plant addition.

SYRACUSE, N. Y.—Solvay Process Div., Allied Chemical & Dye Corp., Milton Ave., has awarded a $1 million contract to H. K. Ferguson Co., 1783 E. Eleventh St., Cleveland, for design and construction of a research laboratory.

TONAWANDA, N. Y.—O-Cel-O Inc., 80 Leslie St., Buffalo is planning to build a $150,000 industrial plant.

OHIO

CANFIELD, O.—Youngstown Steel & Alloy Co.

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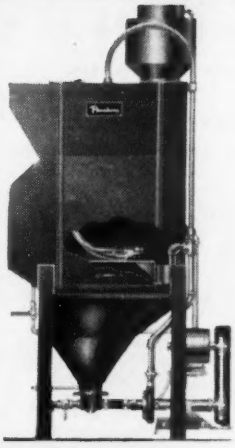

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CLEVELAND—Steel Improvement & Forge Co., Charles H. Smith Jr., president, 970 E. 64th St., is completing an expansion program to increase its production capacity of forged gas turbine blades in the air force's jet engine program.

CLEVELAND—Frontier Industries Inc., Ralph F. Peo, president, Buffalo, has purchased the Fairmount Tool & Forging Co., 10611 Quincy Ave., which manufactures automobile body tools, automotive and road machinery, farm implement tools and wrenches.

MARIETTA, O.—Electro Metallurgical Co., New York, is making plans to build a ferroalloy plant near here on the Ohio River which will produce ferro-alloys for use in the manufacture of steel and iron.

YOUNGSTOWN—Ohio Machinery Co. is building a $300,000 plant to sell and service machinery and equipment.

OKLAHOMA

AYLESWORTH, OKLA.—Universal Oil Products Co., Tulsa, is planning to build a $350,000 natural gasoline plant.

PONCA CITY, OKLA.—Continental Oil Co., H. G. Osborn, vice president, plans to spend $7,750,000 on a refinery expansion program.

OREGON

PORTLAND, OREG.—Morris P. Kirk, c/o National Lead Co., 111 Broadway, New York. is planning to build a $2,500,000 plant for production of nonferrous metal alloys.

PORTLAND, OREG.—A. M. Andrews Co., 534 N. E. Eighteenth Ave., has started producing a machine for joining plastic sheeting.

PORTLAND, OREG.—Barbur Blvd. Sheet Metal Works, 9914 S. W. Pacific St., is a new concern specializing in sheet metal fabrication.

PORTLAND, OREG.—Beaver Sheet Metal & Roofing Co., 2182 N. Lewis St., is a new fabricator of sheet metal products.

PORTLAND, OREG.—Ideal Furniture Mfg. Co., Ft. S. W. Gibbs St., has been established to assemble chrome furniture and novelties.

PENNSYLVANIA

McKEESPORT, PA.—Kelsey-Hayes Wheel Co., 3600 N. Military St., Detroit, has awarded a $500,000 contract to Austin Co., 16112 Euclid Ave., Cleveland, for additions and alterations to its present buildings.

PITTSBURGH—Hudson Motor Sales Corp., Brushton Ave., has awarded a $125,000 contract to W. C. Funk, 514 S. Winibiddle St., for a headquarters and service building.

SHARON, PA.—Shenango Tube Co. has been formed with $1 million capital to take over the tubular division of Mercer Tube & Mfg. Co., D. V. Sawhill, president. The new company will use the electric weld process in making tubing for automobiles, furniture, and other uses.

SOUTH CAROLINA

SPARTANBURG, S. C.—Piedmont Natural Gas Corp. is planning to build a $75 million natural gas pipeline.

TEXAS

DALLAS, TEX.—Gillette Motor Transport Inc., 2508 S. Harwood St., is planning to build a $250,000 office and cafeteria, a $75,000 mechanical repair shop and a $125,000 warehouse; plans by Roy E. Lane, Construction Bldg.

EL PASO, TEX.—Phelps-Dodge Corp., plans to spend $300,000 on improvements in its copper refinery plant.

FORT WORTH, TEX.—Consolidated Vultee Aircraft Corp., Grants Lane, is contemplating plant alterations costing $300,000.

WISCONSIN

KENOSHA, WIS.—Nash-Kelvinator, 14250 Plymouth Rd., Detroit, is contemplating adding a $900,000 engine and transmission parts extension to its engine plant; plans by Giffels & Vallet, 1000 Marquette Bldg., Detroit.

PORT WASHINGTON, WIS.—Wisconsin Electric Power Co., 231 W. Michigan St., Milwaukee, is contemplating construction of a power station which will cost $13 million including equipment; plans by Fred A. Luber, c/o owner.

CANADA

CAP DE LA MADELEINE, QUE., CAN. — Newcastle-on-Tyne Zinc Oxide Co., Newcastle-on-Tyne, England, is planning to build a $150,000 zinc oxide and paint pigments manufacturing plant.

ST. JOHNS, QUE., CAN.—Singer Mfg. Co. Ltd., St. Paul St., has awarded a $200,000 contract to Auglin-Norcross, Quebec Ltd., 892 Sherbrooke St. W., Montreal for a foundry extension; E. C. Miller, 485 McGill St., Montreal, architect.

PRICES OF LEADING FERROALLOYS PRODUCTS

(*Concluded from Page* 167)

c.l. and 0.9c for l.c.l.; Western, add 0.35c for c.l. and 1.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Eastern Zone, contract, carload, bulk, 10c per lb of briquet, c.l. packaged 10.8c, ton lot 11.6c, less ton 12.5c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Eastern Zone, contract, c.l. bulk 10c per lb of briquet, c.l. packed 10.8c, ton lot 11.6c, less ton 12.5c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (**Large size**—weighing approx. 5 lb and containing exactly 2 lb of Si). Eastern Zone, contract, carload, bulk 5.75c per lb of briquet, c.l. packed 5.9c, ton lot 7.35c, less ton 8.25c. (**Small size**—weighing approx. 2½ lb and containing exactly 1 lb of Si). Eastern Zone, carload, bulk 5.9c c.l. packed 6.7c, ton lots 7.5c, less ton 8.4c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.45c for c.l. and 0.9c for l.c.l. Freight allowed. Add 0.25c for notching, small size only. Spot, add 0.25c.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Eastern Zone, contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.75c, ton lot 21.55c, less ton 22.55c; Central, add 0.5c for c.l. and 0.85c for l.c.l.; Western, add 2.55c for c.l. and 2.6c for l.c.l. Freight allowed. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Eastern Zone, contract, carload, lump, bulk 16.25c per lb of alloy, carload packed 16.45c, ton lot 19.35c, less ton 20.85c; Central, add 0.5c for c.l. and 0.75c for l.c.l.; Western, add 2.55c for c.l. and 2.90c for l.c.l. Freight allowed. Spot, add 0.25c.

VANADIUM ALLOYS

Ferrovanadium: Open Hearth Grade (Va 50-55%, Si 8% max., C 3% max.). Eastern Zone, contract, any quantity, $2.90 per lb of contained Va.; Central, add 2c for c.l. and 3c for l.c.l.; Western, add 6c for c.l. and 9c for l.c.l. Freight allowed. Spot, add 10c. **Special Grade** (Va 50-55%, Si 4% max., C 1% max.), $3. **High Speed Grade** (Va 50-55%, Si 1.50% max., C .20% max.), $3.10.

Vanadium Oxide: All Zones, contract, less carload lots, $1.20 per lb of contained V_2O_5. Spot, add 5c.

Grainal: Vanadium Grainal No. 1, 93c; No. 6, 63c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

TITANIUM ALLOYS

Ferrotitanium: (Ti 20-25%, Al 3% max., Si 4% max., C 0.10% max.). Eastern Zone, contract, ton lot, 2" x D, $1.35 per lb of contained Ti, less ton $1.40. (Ti 40-45%, Al 7% max., Si 4% max., C 0.10% max.). Ton lot $1.23, less ton $1.25; Central, add 4c for 20-25% Ti grade, and 2.1c for 40-45% grade; Western, add 13.5c for 20-25% Ti grade, and 7.2c for 40-45% grade. Freight allowed. Spot, add 5c.

Ferrotitanium, High-Carbon: (15-20%). Contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C, $142.50; 3-5% C, $157.50.

TUNGSTEN ALLOYS

Ferrotungsten: (W 70-80%). Eastern Zone, contract, 10,000 lb W or more, $2.25 per lb of contained W; 200 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Eastern Zone, contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Eastern Zone, contract, c.l., lump, bulk 6c per lb of alloy, c.l. packed 6.75c, ton lot 7.5c, less ton 8.35c; Central, add 0.25c for c.l. and 1.1c for l.c.l.; Western, add 0.6c for c.l. and 3.95c for l.c.l. Freight allowed. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Eastern Zone, contract, carload, lump, packed 18.4c per lb of alloy, ton lot 19.15c, less ton 20.40c; Central, add 0.6c for c.l. and 1.05c for l.c.l.; Western add 3.05c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Eastern Zone contract, 100 lb or more. 1" x D, $1.20 per lb of alloy, freight allowed. Less than 100 lb $1.30; Central, add 0.75c; Western add 2.9c, freight allowed. Spot, add 5c.

Borosil: (3 to 4% B, 40 to 45% Si), $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Eastern Zone, contract, ton lot, 2" x D, $2.75 per lb of contained Cb, less ton $2.80; Central, add 1.65c; Western, add 6.45c. Freight allowed. Spot, add 10c.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Eastern Zone, carload, 12 M x D, carload packed 17.25c per lb of material, ton lot 18.00c, less ton 19.25c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l., and 3.05c for l.c.l. Freight allowed.

Silcaz Alloy: (Si 35-40%, Ca 9-11%; Al 6-8%, Zr 3-5%, Ti 9-11%, Boron 0.55-0.75%). Eastern Zone, carload, packed, 1" x D, 39c per lb of alloy, ton lot 41c, less ton 43c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Eastern Zone, contract, carload, packed, ½" x 12 M, 15.0c per lb of alloy, ton lot 15.75c, less ton 17.0c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed. Spot, add 0.25c.

Graphidox No. 4: (Si 56%, Ca 5%, Ti 9%) C.l. packed, 16.50c per lb. of alloy; ton lots 17.90c; less ton lots 19.40c, fob Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%; V-7, Cr 28-32%, Si 15-21%, Mn 14-16%) C.l. packed, 12.95c per lb. of alloy; ton lots 14.60c; less ton lots 15.85c, fob Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al). Packed, lump, carload 11c, ton lots 11.25c, smaller lots 11.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Ferrophosphorus (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base): Gross tons per carload, fob sellers' works, Mt. Pleasant, or Siglo, Tenn.; $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.